

ERRORS IN SCHOOL

JOHN ADAMS

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THEIR CAUSES AND TREATMENT

IMPORTANT WORKS BY
SIR JOHN ADAMS, LL.D.

SOMETIME UNIVERSITY PROFESSOR OF EDUCATION
IN THE UNIVERSITY OF LONDON

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P R E F A C E

THE detection and correction of errors form such an important part of the teacher's work that he cannot afford to neglect their study. Yet he cannot be expected to plunge into the depths of the metaphysical maelstrom involved in the discussion of the ultimate problems of truth and error. Accordingly the following pages deal with errors in such a way as to help the teacher in his work, without demanding from him an elaborate philosophical preparation. But it is impossible to deal satisfactorily with errors in school unless we adopt some broad, general point of view from which all the details can be envisaged and reduced to some sort of system. For expository purposes the following pages develop a somewhat atomistic scheme, under which the building up of mental content may be dealt with in an intelligible way.

The reader is not called upon to accept as final the doctrine underlying the exposition offered. It may be legitimately regarded as a huge figure of speech that enables the writer to present his subject in a fairly systematic way and to give a certain coherence to the mass of disparate matter with which he has to deal.

In treating the elements that make up mental content it is necessary to distinguish between the

active and the passive. In the text the term *idea* is restricted to the passive sense, while the active is represented by the term *concept*. This distinction is not explicitly recognised in general psychological writing, but is often implied and in any case may be found useful by teachers.

To keep the text as close to the practical as may be, the treatment of error has been restricted to the cognitive side, so far as that is possible. The teacher's main business is with knowledge, though the æsthetic and ethical aspects thrust themselves upon him, and must be treated as occasion demands.

Still further to limit the field to workable proportions the following pages treat the teacher's mental content as perfect in so far as it is concerned with the range of subject-matter that he professes. Within that range he may be not unreasonably regarded as error-proof.

All these limitations and assumptions and many more that are to be found in the text, must be regarded as conventions which the reader is asked to accept without thereby committing himself to give up any of his own philosophical convictions. The conventions make possible a more or less consistent presentation of the facts of the case in their bearing on each other. Ultimate explanations may well be left to the metaphysicians. Among them let the reader make his choice.

J. A.

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ERRORS IN SCHOOL

CHAPTER I

THE ÆSTHETIC SIDE

WHEN they read in Shakespeare's *Julius Cæsar* the phrase "hateful error, Melancholy's child," many people are inclined to question the imputed parentage. They are impelled to suggest a more cheerful origin, and they call up as an evidence against himself Shakespeare's own *Comedy of Errors*. But while there is a sunny side to blunders, their prevailing atmosphere is one of gloom.

The adjective "hateful," again, is certainly of general application to error, but all errors do not justify it. Certain of them have an expository value of their own. An error may be a stepping-stone to truth. We find, for example, Will Durant in his *Story of Philosophy* speaking of one aspect of pragmatism as "a useful error, not a truth." In ordinary school work it must be admitted that the hateful suggestion is generally in place. But even here there are exceptions, for error sometimes brings with it a brightness that is very welcome in the classroom. As we go on we shall find sufficient justification for the Shakespearian gloom. The vast realm of school error is filled with deviations from

truth that have no redeeming scintillation of brightness. It is true that in our study of errors in the school we shall find a certain interest in error as such, that will for the time being carry us over the dreariness that almost invariably accompanies the ordinary blunder. Misapplying the *Shorter Catechism*, we may say that some errors in themselves, and by reason of several aggravations, are more heinous in the sight of the teacher than are others. Among the less heinous blunders are those that by their very nature carry a cheerful atmosphere with them. In other words, there is a sunnier side to errors, however seldom it may make its appearance: and perhaps we may be permitted to begin our studies on the cheerful note. The teacher can get little diversion from the endless round of commonplace errors that fill up the interstices of his school-room experience, the persistent disagreements of tenses, numbers, and genders, the extravagant dislocation of dates, the amazing liberties taken with mathematical formulæ. There is nothing stimulating in correcting the impression that "Marlow's *Faustus* is based on Goethe's *Faust*," or that "anodyne is a by-product of coal," or even that "the Scriptures are not synonymous." Only a fleeting interest is aroused when a mature student ventures on the statement that "every tree has its druid": and we can put the dryad in her proper place with hardly a smile.

There are, however, certain blunders that rise into a more stimulating atmosphere, and call for more friendly treatment. To the familiar vocabulary of the teachers' common-room belongs the

word "howler." It is not yet rigorously defined, but is used in an easy-going way to indicate those flashes of unconscious humour that occasionally light up the gloom of the workaday class-room. The ordinary mistakes that the pupils make with such astonishing facility are blunders, and nothing more; they are so like one another that they merely bore the teacher. So it is not surprising that when a funny error comes along the teacher notes it with pleasure, gloats over it, and rejoices that he has a name ready to label the quip withal. It is to be noted that the howl of laughter, that presumably gave rise to the term, comes from the teacher; the youngster who contributes to the mirth of the common-room does not himself see anything to laugh about. If he did, there would be no true howler.

In the American magazine *Life* there was once a picture of a schoolboy, who, in answer to the teacher's demand for an example of a collective noun, answered, "a vacuum cleaner." The smile on his lips and the quizzical expression on his face as he turns to his class-mates for applause clearly marks off this sally as belonging to a region outside the howler range. It is the boy's joke. He appreciates it as much as the teacher; in all probability more. On the other hand, we have a genuine howler from the boy who did his best to meet his teacher's demand for an explanation of the term "grass widow." Knowing the meaning of each of the two words making up the phrase, but never having seen them used together before, he followed the light of nature and ventured on "the wife of a

dead vegetarian." Here the amusement belonged entirely to the teacher; the boy had answered in all good faith.

What, then, are the characteristics that mark off the howler from the ordinary humdrum mistake that rouses little interest and no enthusiasm in the teacher occupied in his daily routine work? The natural answer is that it must possess the usual qualities that mark humour in whatever form it occurs. *Unexpectedness* is of the essence of the matter. Next comes *incongruity*; ideas are presented not only in an unexpected combination, but in one that does not fit in to our ordinary experience. The combination may be in itself a reasonable one, and, as a matter of fact, be an actual one, and quite within the range of the pupil's experience. The humour comes in because the teacher's wider experience includes a different region altogether. The history lesson was on Henry VI of England, and the teacher asked the question, "What do we know of Margaret of Anjou?" He expected some information about her character, her genealogy, her aspirations. Instead, he received from one of his boys the bald statement, "She was very fat, sir." This was news to the teacher, who turned over in his mind all that he could remember about Margaret, including her statue at Angers, where she certainly looks massive and regal, but hardly fat. Being a wise man, however, he did not challenge the boy's statement, but contented himself with asking for his authority. The boy simply stated, "It's in the book, sir," and on being invited, turned over the pages and read aloud with conviction the passage:

“Among Henry’s stoutest supporters was Margaret of Anjou.” To the boy’s mind there was no incongruity, to the master’s there was.

A third element leading to the satisfaction the teacher finds in howlers is not usually included in the analysis of humour, as unexpectedness and incongruity certainly are. This is the *sense of superiority*. No doubt in many cases the enjoyment of humour does involve this sense. But it is not usually stressed. In the case of the howler it is of the essence of the situation. It tickles our self-esteem to realise how much more we know than does the perpetrator of the howler. Perhaps this added pleasure is more conspicuous in the case of the layman than in that of the professional teacher. The schoolman is so accustomed to the feeling of superiority, so used to putting other people right, that he does not in this respect get the layman’s thrill out of a sparkling error. To be sure, there are people who appear to be born error-seekers and error-correctors, quite apart from their profession, whatever that may happen to be. Doubtless such people get an unusual, a morbid pleasure out of the howlers made in ordinary life. For howlers are by no means confined to the school-room, though it is rare that they make such a dramatic display as they do there. Your congenital corrector, however, usually contrives to make howlers out of comparatively undramatic errors.

Most people, for example, suppose that we mean what we say when we speak of cork legs, and are much surprised to be told that these artificial limbs are not made of cork at all, their name being taken

not from the material of which they are made, but from the man who invented them, a certain Dr Cork. English people naturally enough suppose that a jack-ass has four legs, and thus offer to their Australian cousins the chance of being superior and explaining that the creature is a bird. It is not a very laughable error to suppose that cat-gut comes from cats, but there are people who get enjoyment out of explaining that this is not so. It may come as a shock to some to be told that black beetles are not black, and, in point of fact, are not beetles. But there is not much of a laugh to be got out of this correction of popular belief.

Indeed, most of the errors we meet among adults can hardly be called howlers, since they do not raise from the bystanders even a smile, save the disagreeable smile of superiority. When an ignorant street-orator who favours feminism speaks sympathetically of "Women's Suffrage," under the impression that the term refers to the wrongs women have had to suffer, there is justification for at least a broad grin; but when we find a man speaking as if the pendulum supplied the force that works the clock, our smile indicates superiority and nothing more.

At school, however, there is an additional incentive to smiling, if not indeed to laughter. In most cases the ordinary school routine is so monotonous that any break is welcomed. Children will laugh at almost anything that happens out of the ordinary, and weary teachers are not far behind the children in this respect. Accordingly, errors that would be merely passed over in adult society are sometimes

entitled to howler rank in the class-room. Indeed, it is sometimes hinted that schoolmasters are so keen for relief of this kind that they actually lay themselves out to cultivate them. It is suggested that those General Knowledge papers, that bring such a crop of amusing answers to the columns of the newspapers, owe their existence in some part at least to the relief the funny answers give to a jaded staff towards the end of a long term. It is perhaps hard to account otherwise for this sort of examination. The old-fashioned examiners were accused of having an altogether wrong aim in their work. Instead of trying to find what the candidates knew, it was maintained that the examiner set out to discover what they did not know. In other words, the examinations were mistake-traps. There was not even the justification that the traps were set so that the resulting errors might be corrected. This use of such traps will be dealt with later. In the meantime it is enough to point out that the old examinations had no such deep purpose. Once the examination was over, and the results published, the candidates had either passed or failed, and that was all about it: the incident was closed.

The General Knowledge paper is now, however, getting a certain amount of support from the psychologists, who themselves use this form of test for the purpose of estimating the intelligence of persons handed over to them for mental evaluation. It is found that there is a high correlation between wide general information and good mental capacity. In plain English, it appears that well-informed people

are usually intelligent, and that, in a rough and ready way, the wider the knowledge the keener the intelligence. Certainly this generalisation admits of many and important exceptions, but it is sufficiently accurate to be of practical service, and, in point of fact, was used with great success by the American military authorities during the Great War. It will be remembered that the Americans, with more faith in psychology than was to be found in Britain, at once mobilised their psychologists, and set them to work in sorting out the human material to be used. As a result of their success it has come about that trial by error has obtained some recognition as a mode of testing intelligence, and thus a sort of respectability has been cast over the General Knowledge paper.

It would be well if this use of the paper were more generally emphasised, for as things stand it is often employed as if it were a means of testing the pupil's industry and seriousness as a student. Now it is impossible for the student to prepare himself specifically for this examination, and therefore industry has no definite relation to his success. The pupil cannot be expected, like Bacon, to take all knowledge to his province. Masters sometimes make a merit of the absence of any text-book on the subject of General Knowledge; but in that case, they should not attach any moral merit or demerit to success. As a matter of fact, secondary schoolmasters are not quite accurate in saying that there is no text-book available. A little more than half a century ago, at the end of the second year at a training college the young men of Britain had a

special General Knowledge paper; so after the bad fashion of these old examination days, an enterprising publisher brought out a little manual to meet the dire needs of the students. It was not a very successful manual from the very nature of the case, so the secondary schoolmasters are justified in their belief that there is now no available means of specific preparation for a General Knowledge paper.¹ The schoolboy's only hope lies in the encyclopædia. Few have the daring to face the *Britannica* or the *International*, and when it comes to the intermediate-sized encyclopædia, youngsters are almost as much daunted by ten volumes as by thirty-three. Certainly there is a tempting little pocket cyclopædia published by an enterprising soap firm at the alluring pre-war price of sixpence. Even at the advanced post-war rate the little volume is well worth its cost to the struggling candidate for universal knowledge, particularly as it is darkly hinted that the masters themselves find the little manual not inconvenient as a source of questions. Such specific preparation by the pupils is really an attempt to defeat the ends of the examination—unless, indeed, the real purpose of the examination is to produce a luxuriant crop of howlers.

It has sometimes been suggested that it would be instructive to have the teachers who set the papers in General Knowledge submitted to a similar test by some competent outsider. If this could be

¹ As this goes through the press I have received the advertisement of a substantial volume on General Knowledge that is quite evidently written for pupils who have to face examination papers of this kind.

done, and the teachers compelled to answer just as the pupils are, there is little doubt but that the crop of howlers would be much greater than among the youngsters. This effect would be rather natural. For, after all, the teachers would have greater potentialities in the matter of howler-making. The wider one's range of knowledge the better chance of meeting demands about unknown matters. The more one knows the less willing one is to take chances at a problem without data, and were it not made compulsory to answer something or other the teachers' General Knowledge papers would produce a bundle of scripts with a very high percentage of blanks, where the writers were in doubt about the answers. But if every question had to be answered some way or other there would result a highly amusing crop of intelligent guess-work answers. The teachers would have such a vast body of knowledge to fall back upon that if they did make errors they would make very ingenious travesties of the truth. If the combinations they made of their ideas were wrong, then they would be likely to be amusingly wrong. The ingenious guess of a well-informed person, if wrong, is likely to be interestingly wrong, in fact, to be a howler.

Without doubt the candidate in the general written examination in connection with Harvard University was in dead earnest when he set about explaining the phrase "out-heroding Herod," which, among others, was submitted as a test. He stated that it meant lying harder than the other fellow, and originated in the fact that Herod, "whose full name was Herodotus," was a notoriously unreliable

historian. Amusing as this explanation seems to us, it is evident that it was offered in all good faith, and was, in fact, the result of a not discreditable ingenuity. But had the candidate not known the bad reputation of Herodotus the howler could not have occurred.

A howler, then, may be defined as a blunder that is made in good faith, and is amusing to those who know the truth about the matter dealt with. While it is not confined to the school-room, it is of more importance there than in ordinary life. Elsewhere it is an amusing incident and nothing more. In school it must be taken seriously. The plain man can encounter a howler, smile, and pass on without sin. Not so the teacher. It is part of his business to note and to *understand* howlers. Every time that a howler is made, and the teacher can explain how it occurs, he is entitled to put a good mark opposite his name, and to go on comfortably to his next encounter with his pupils. But on every occasion when a howler has an origin inexplicable to the teacher, he ought to put a bad mark against his name, and go for a time into professional sackcloth and ashes. A howler that cannot be analysed and explained by the teacher indicates an unexplored tract of pupil mind, and it is of the essence of his craft that the teacher should encounter as few of these tracts as possible. To be sure, a complete chart of the pupil's mental content is beyond the teacher's grasp; but the nearer it can be approached, the more is the teacher a master of his craft.

Truth to tell, some teachers take up quite a wrong attitude towards howlers. They enjoy them, as they are entitled to do, but they lack moderation.

There is a limit here as elsewhere, beyond which the wise do not go. We have a right to enjoy a howler, and to get as much pleasure out of it as is consistent with our keeping an eye on its underlying significance for us as teachers. Sometimes teachers go about proclaiming their own defects by the howlers they cull from their class-rooms and gloatingly tell to the world. For howlers are of the boomerang type, and sometimes come home to roost with the teacher. In other words, they are sometimes the direct results of bad teaching, and a critical examination may bring out their parentage. Indeed, there is a certain parallelism between this aspect of the howler, and that aspect of the dream that has come into sinister prominence in the activities of the psycho-analysts. These read so much into dreams and learn so much from them, according to their own statements, that cautious people are inclined to be very reticent in describing their dreams in psycho-analytic circles. For the same reason teachers should be careful in retailing their catches of howlers, lest haply they may expose certain of their own professional weaknesses.

In an examination of a university extension class it was found that in the English Literature paper quite a number of the students had given *Aberdeen* as the answer to the question: "Where did the Canterbury Pilgrims start from?" Investigation showed that this remarkable blunder resulted from the indistinct speech of the lecturer. His repeatedly mumbled "Tabard Inn" conveyed no meaning to his students, who had never before heard of that Southwark hostelry, but who were familiar from

their geography books with the name Aberdeen, so they naturally removed the starting point of the pilgrims some five hundred miles north of the London district.

School inspectors, whose business it was to go about examining pupils in elementary schools, used to do their best to discourage rule-of-thumb teaching, and in their investigations sometimes brought out howlers that hinted broadly at the wooden teaching that made them possible. Stereotyped methods and mechanical definitions were fruitful sources of amusing error. One such inspector asked a class what a noun was, and got the mechanically accurate, "A noun is the name of a person, place, or thing—as John, London, book." The next question was, "Are you a noun?" The boy admitted that he was. In order to emphasise the point that the noun is a *name*, and not the object it indicates, the inspector went on: "And are all these boys running about in the playground nouns too?" Suspecting a trap, and remembering the stereotyped illustrations of the functions of the various parts of speech, the boy answered, "Please, sir, no sir, these are verbs."

The folly of mere text-book teaching is well illustrated in the answer given to the question in history: "What was Monmouth executed for?" The boy's reply, "For stealing peas," was accounted for by the pathetic detail mentioned in the text-book when describing the capture of the rebel leader in a ditch, "with his pockets full of peas." This little fact had caught the boy's imagination, and he put the boyish interpretation on it, believing that,

in those old days, if they hanged a man for stealing a goose they might also behead a man who stole peas.

While howlers stand out as the picturesque forms of error, and are therefore comparable to lighthouses on the great ocean of inaccuracy, there is a vast body of commonplace error continually interfering with the teacher's work. Accordingly, it is well worth his while to make a careful study of the subject from the professional point of view. Just as we often get our pupils to understand a troublesome word by directing them to a word that means just the opposite, so we may get a better understanding of a truth by considering the corresponding error. So the study of error may be regarded as in a sort the negative study of truth. There is need for standards in this study, and for a delimitation of the fields of truth and error. The purpose of the following pages is not to treat of error in general as the negative aspect of truth, nor of the great problem of the nature of things. In short, we are not concerned with metaphysics. It is proposed to treat of error with special reference to the work of the teacher.

But even with this limitation there is room for further restriction. The teacher's work has two main aspects—instruction and education. The distinction is real and important, but too much may be made of it if we treat the matter controversially. No doubt the process of education is one and indivisible, but for practical purposes it is convenient to regard it from the two aspects, the teaching aspect and the wider aspect that includes the whole. It may be said that we can educate with-

out teaching, though we cannot teach without educating. But a clever controversialist would find no difficulty in breaking down the distinction. Still the difference is of sufficient practical importance to make it intelligible to say that it is proposed in this volume to deal with the matter mainly from the standpoint of teaching, though it will be impossible, and not altogether desirable, to attempt a total elimination of the wider aspect.

At the very beginning there is the problem of the sort of errors we are to deal with. There are obviously many kinds of error that occur in school; but they naturally fall into two main classes that may be kept apart without any excessive profundity of classification. When we have made the clean-cut division into errors of the teacher and errors of the pupils, we have made a rough-hewn separation that prepares the way for our discussion. The fundamental subject-matter for us is the errors made by pupils. No doubt the moment we begin to deal with error from this standpoint we shall find that we are wandering into discussions of the errors made by the teacher in his instruction. This cannot be avoided, since we must consider the causes of the pupil-errors and the best methods of dealing with them. But as soon as we have declared the kind of errors that are to occupy the limelight, there is less fear of confusion when we deal at the second remove with the errors teachers make in relation to the pupil-errors that in many cases arise therefrom.

Since we want to approach the subject with a practical end in view, we must keep in the forefront the purpose of eliminating errors. We are not to

study them merely from the natural history standpoint that is content to describe them and classify them. We must go farther, and try to get rid of them. From one point of view, we may be said to have made a bad beginning by starting with the howler. For this form of error is treated from the æsthetic side, and has a popular appeal that is entirely lacking when we come to treat of the ordinary error that is occurring every day in school, and has nothing to commend it to the practising teacher, unless he can get up an interest in it from the professional side. The howler makes an excellent opening, but the plain error must form the groundwork of our treatment.

Teachers are here liable to a temptation to which doctors, and in particular psycho-analysts, are apt to yield. They are inclined to gloat over symptoms, and to neglect what the public regard as the doctor's first duty—the cure of the patient. If a doctor comes across a perfect specimen of some disease, one that exemplifies all the characteristics described in "the books," he has a professional joy that impels him to call in some of his professional brethren to enjoy with him this perfect sample. So the ordinary writer on psycho-analysis finds himself so absorbed in the wonderful way in which a particular case exemplifies his theories, that he is inclined to gloat over it, and work up this aspect, and forget to tell his readers whether the patient recovered or not. In the same way, when teachers get together they sometimes exchange "howlers," and content themselves with enjoying the humour. The better sort among them, however, are not content unless they

can get at the inner meaning of the error, and from that learn something for their future guidance.

The plain error with no intrinsic interest forms the foundation of the professional teacher's daily work, just as the ordinary undignified diseases make up the bed-rock of the general practitioner's daily round. As the doctor must study rather carefully the whole working of the human body in order to be able to treat these inconspicuous and humble ailments, so must the teacher get at the laws of ordinary mental process in order to be able to deal with errors that may be said to be, in a sense, the result of mental disease, functional or organic. This talk of doctors and disease naturally suggests a mode of dividing up our subject so as to present it in a fairly systematic way, without, however, allowing ourselves to make the scheme rigid. There must be a reasonable give and take, or our treatment becomes pedantic.

Before the doctor can begin to deal with diseases, he must learn what they are. He has first to find out how the normal healthy body works, and then to detect any variation for the worse. The body can go wrong in a distressingly large number of ways. Many of these get names, and we have a list of diseases. Physiology is the study of the healthy working of the body, and pathology the study of the various ways in which the body misbehaves itself, goes wrong, or, as ordinarily expressed, becomes diseased. For the doctor's physiology the teacher substitutes the study of psychology, but for pathology there is not yet a separate study in the teacher's curriculum. It is true that defective

children are now being carefully studied, but the ordinary professional teacher is not called upon to deal with defectives. This demands a special branch of study, belonging as much to the doctors as to the teachers. But there is an aspect of the regular teacher's work that corresponds to pathology. This is the realm of error. In his work with normal healthy pupils the teacher necessarily deals with error. It cannot be avoided; it forms a stage in the progress to knowledge. No doubt it can be reduced to a minimum, and that is, in fact, one of the chief functions of the teacher. But it is there, and will remain there to all time, though no doubt teachers will improve greatly in their treatment. It is a part of the process by which humanity has attained its present status of knowledge and skill, and it is an essential part of the teacher's equipment that he be able to short-circuit the laborious method of trial and error by which the human race as a whole has won its present position. Naturally, therefore, the study of error and its treatment should form an important part of the preparation of the teacher for his work.

In dealing with the subject in this book we must be allowed to take a good deal for granted. We cannot, for example, cover the whole ground of psychology, but must content ourselves with such practical applications of it as will meet the needs of the case. Doctors talk learnedly about prognosis and diagnosis. We must cover some of the ground that corresponds to these terms so far as they may be legitimately applied to education. We have first of all to make up our minds regarding the causes

and nature of error, then to find out how to detect error when it occurs, and finally how to deal with it when discovered. To be sure, there is an important matter to be considered between determining the nature of error and setting about its treatment. This is the problem of finding a method of avoiding error altogether. Preventive medicine is now occupying a very important place in the thoughts of professional physicians. As children we were brought up in the pleasing belief that in China doctors were paid on the satisfactory basis of a steady if small payment so long as the patient was well, and an absolute cessation of payments while the patient was ill. Modern doctors must look forward to some such system of payment, if they go on in their present lines of preventing diseases. By what they call prophylactic treatment they meet an impending disease, and dissipate it before it has time to entrench itself.

Here the teacher may well imitate the physician, and embark on a scheme of anticipating errors, and by suitable arrangements prevent them coming to birth. The really capable teacher can do a great deal to keep down the crop of errors that are continually appearing in the school-room, and the tendency of progress in teaching is quite parallel to that in medicine. Prevention is becoming the dominant note.

But when all has been done, there must remain a crop of errors. Every avoidable error that occurs in the school-room should stir the conscience of the teacher. If a clergyman is invited to preach a sermon to a conference of teachers he could not do

better than choose for his text Luke, xvii, 1: "It is impossible but that occasions of stumbling should come: but woe to him through whom they come!" It would be better for the preacher to omit the rest of the verse, as it is too depressing, and introduces elements that are not essential to the cognitive side of the teacher's work; though probably none of us would be any the worse of being told that "It were well for him if a millstone were hanged about his neck, and he were thrown into the sea, rather than that he should cause one of these little ones to stumble."

Whatever be the rights of this matter, the fact remains that errors will come, and must be treated. Accordingly, we have to take account in our school work of what corresponds to therapeutics in medicine. This is the name doctors give to the specifically curative part of their work. Patients sometimes think that this aspect of the doctor's work does not always get the prominent place it deserves, and that keen physicians sometimes give undue attention to the symptoms as such, and regard the mere cure as a by-product. There is perhaps occasion for a similar charge against educational theorists in their own sphere. So it is well that our attention should be kept as closely as possible upon the practical aspects of our dealings with error.

In dealing with this subject of error in school there was a strong temptation to give oneself up to the terminology of the older science, and divide up the subject into such sections as Cognitive Pathology, Epistemological Prognosis and Diagnosis, Ptaismatic Therapeutics. But while we keep in

view the medical parallel in order to get whatever light it may lend to our investigation, we must content ourselves with the treatment appropriate to our own subject, retaining only an occasional side reference to the sister science to show that we are not neglecting her teachings and warnings. Some of the terms we use where they prove convenient, but we retain our freedom to arrange our order of presentation in the way most suitable for our purposes.

Returning now to the æsthetic aspect, it would seem that in the vast mass of commonplace errors, amidst which the teacher must spend the greater part of his professional life, there is no æsthetic element at all. Yet they create an atmosphere which certainly has its æsthetic aspect, that affects both teachers and pupils. The general effect is depressing; dampening for the teachers, and irritating for the pupils. The prevalence of errors and the need to deal with them have the effect of producing a special attitude of the teacher. By being continually on the alert for errors he acquires a peculiar sensitiveness to any deviation from the narrow path of accuracy. He is apt to become too touchy in this direction, and to develop into a professional fault-finder. He may have the best motives possible, but there is a clear danger that his attitude may introduce into the school-room an atmosphere that is, to say the least, unattractive. Outsiders are probably more keen in sensing this depression than are professional teachers. This is perhaps why Gentile and his fellow directors of Italian elementary education have taken special note

of its existence. Their ideal is happiness in the schools, and they note that this fault-finding attitude works effectively against that ideal. In the directions issued to the Italian elementary teachers in 1924—probably the most human set of instructions ever officially issued to the professional teachers of a nation—it is perhaps natural to find the depressing effect of continual fault-finding brought to the forefront. It is pointed out that steady correction on the part of teachers cannot but produce a strained relation between instructors and instructed. Persistent fault-finding cannot but irritate the pupils, but what is the teacher to do? He cannot allow the errors to go unchecked, unless he can share the optimism of Gentile and his colleagues, who assure the teachers that accuracy will come in due course, and almost of its own accord. The treatment of errors as they occur will have to be dealt with in detail at a later stage. In the meantime we are concerned with the æsthetic side, and it must be admitted that the Italian authorities are right in calling attention to the dangers of the atmosphere of correction, though they have not taken the trouble of suggesting any more effective protection than easy-going letting things slide. The truth is that there is much more in this matter than has entered into the philosophy of the kindly optimists of educational headquarters at Rome.

It has to be realised that there are certain temperaments that find something not altogether unpleasant in pointing out the errors of others, and it is a rather common thing for outsiders to point to this enjoyment of fault-finding as a characteristic of the

professional teacher. In truth, this is a boomerang criticism that recoils upon the critic. It is your layman who really enjoys fault-finding. When the correction of errors becomes a part of one's daily work it soon loses the charm that perhaps it had at the beginning. In talking to aspirants to the teacher's chair, it is not uncommon to find this desire to keep others straight figuring rather prominently in the young mind. One of the answers given to the question, "Why do you wish to become a teacher?" in a written examination paper was, "Because I shall have the book, and the pupils won't." Though such frankness is rare, the idea is certainly present in a good many young minds that are afterwards to guide others in the paths of knowledge. But the glamour soon wears off. If we have to spend our working days largely in correcting errors, we soon get callous, and take no pleasure in it. If in out-of-school life we sometimes do a little correcting, it is the result of mere habit, and is no indication of satisfaction in the process. The experienced teacher hates error for its own sake, and yet he realises that since error will come, in spite of his best endeavours, he must try to discover the most effective means of dealing with it.

In full sympathy with both the conscientious teachers in all lands, and with the kindly educational authorities of Italy, we must find a compromise that will satisfy both parties on the æsthetic side. Whatever happens, the attitude of fault-finding as such must be given up. The very term suggests an unpleasant state of mind, a totally wrong spirit

for the school-room. No doubt there are some teacher personalities that are so antipathetic to certain pupils that these pupils would willingly deny that two and two make four, for no better reason than that the teacher says they do. But apart from this clash of personalities, the position of professional fault-finder puts the teacher in an altogether unwholesome relation with his pupils. The feeling of superiority—amounting to a disease among certain otherwise normal people, if we are to believe the psycho-analysts—need not, and as a matter of fact in the vast majority of cases does not, enter into the relations between teacher and pupil in the matter of error. It is such a normal thing for the teacher to know more than the pupil that no æsthetic reaction need accompany the situation.

Correction is a regular part of the teacher's business, one of his main functions. It is all in the day's work, and need rouse no more resentment in the pupil's mind than does the giving of next day's school assignments. So far from rousing opposition on the part of the pupils, the treatment of error should draw teacher and pupil together. In a later chapter the idea of partnership in the fight against error will be fully developed. In the meantime emphasis may be laid upon the distinction between the positive and the negative in teaching. Error represents the negative side, and cannot be entirely separated from the positive. The teaching of definite truth is the positive aspect of the work of school; the correction of error, though of vital importance, is a mere negation. Of late years

there has been a distinct reaction against the merely negative in education. Rousseau was perhaps justified in his day in protesting against school methods, and his development of "negative education" was a legitimate reaction against the conditions then prevailing. But to-day there is a vigorous rebound from "thou shalt not" in favour of "thou shalt." Of old the teachers spent most of their time telling the children what they must not do. To-day we are more concerned in telling them what to do. We are passing from the correction of error to the inculcation of truth. The spirit of the pupil is more wholesome when his attention is directed to the finding of truth rather than to the deviations from it. All the fresh methods that mark what is sometimes called the New Education adopt this positive attitude.

But when all is said and done, there remains the residuum of error with which the practical teacher must deal. So while welcoming all the precautions against error, and all the palliatives when error does appear, we must make our arrangements for dealing with it as it occurs in our daily work. We must understand our enemy in order to deal effectively with him. So we proceed to an examination of the nature and origin of error.

CHAPTER II

THE NATURE OF ERROR

AMONG the mercifully short sentences that on the humble pages of our first Latin *delectus* pave the way for the ghastly complications that follow, we find *humanum est errare*. Few pupils need to take the trouble to look up the Latin dictionary in dealing with this easy sentence; they know that it means what it says, and they are content to leave it at that. But if a troublesome schoolmaster comes along, and, not content with a literal translation, demands a fuller explanation, the bored youngster plunges into the dictionary for further ammunition, and then declares that *errare* means to wander. When asked by the persistent pedagogue, "To wander where?" the harassed pupil has usually nothing to say; and to do schoolmasters justice, they seldom follow this line of treatment. The pupil is glad to be free from such troublesome questions, and is in no great need of an answer. With grown-ups the case is different, and as soon as this question is put, they have an urgent need of a reply of some sort. When we look into the problem, we find that it is not so much a matter of where we are wandering to, as of where we are wandering from. At the bottom of the trouble, there is the need of some fixed standard. If the

delectus is right we have all a tendency to wander from some point or line to which we should keep. Our *moral* guides have seldom much difficulty in this matter. They tell us blandly that they are dealing with the path of truth; from that we must not deviate. The inevitable question follows, "What is truth?" If, with jesting Pilate, our guides do not wait for an answer, it is not because they think, like him, that no satisfactory answer is possible, but because they think they already know what the answer is.

Convinced that he knows the nature of truth—has he not a still small voice within him that keeps him absolutely straight?—the moralist confines his attention to ways and means of keeping other people, and especially young people, within the paths of truth. He treats the standard as established, and believes that all he has to do is to see that people live up to it. Errors are mere deviations from an accepted path.

When it comes to truth in the scientific world, there is a region in which the same attitude can be adopted, at any rate towards beginners in knowledge. There is, without doubt, a great body of established facts recognised as such by all educated people. This forms "the truth" for the young student, and any deviation from this is stark error. There is, for example, no element of doubt about the great mass of knowledge contained in the elementary text-books of science. In the higher reaches, to be sure, there is room for all manner of unrest. In these upper regions the standard sometimes wobbles in a disconcerting way. Indeed,

scientific men pride themselves on not only admitting, but on actually proclaiming the possibility of error all along the line. Of late years, indeed, there has been a depressingly frequent need for readjustment of the scientific standpoint. The fixing of standards of truth is a trying process, involving an extraordinary richness of opportunities to go wrong.

Philosophy is the general name given to attempts to introduce some sort of order into the chaos that results from the interaction of truth and error. Sometimes the aim of philosophy is said vaguely to be the pursuit of truth. With this no fault need be found, if we admit that it does not carry us very far, and gives little help in the practical affairs of life. For our present purpose it may be permitted to give the aim of philosophy a more practical turn, even at the expense of an apparent loss of dignity, and a real loss of profundity. But humble as it appears, the aim of *making ourselves at home in our surroundings* is no unworthy one, even for a philosopher. Indeed, when we come to grips with the great philosophers themselves, we may fairly argue that their reflections and meditations centre round just this fundamental problem. The great questions they put to themselves sooner or later are such as these: Who am I? Whence do I come? Why am I here? Whither am I going? It has been said that the whole of Kant's philosophy can be reduced to an attempt to answer the three questions: What can I know? What ought I to do? What dare I hope? In other words, philosophy seeks to provide a guide to life, and in the last resort nearly always turns to *knowledge* as the

essence of the problem. The study of knowledge, in fact, becomes a special department of philosophy. But epistemology, as this branch is named, does not do as much as it might in the way of helping us in our efforts to make ourselves at home in the world. It is coldly abstract, and its exponents are inclined to stand haughtily aloof from the ordinary affairs of life.

However repellent this study is to the plain, practical man, it at least recognises the fundamental importance of knowledge, even from the standpoint of the philosopher. Epistemology is so excessively technical that it seems a thing apart from the everyday world. But its subject-matter is of the utmost importance to the man in the street, as well as to the philosopher. Our present practical problem is to find some standard of truth that shall enable us to determine when we fall into error. There is, indeed, a complete science called Logic, that in the most learnedly complex way tells us, after the fact, how we have gone wrong. It has a recognised standard, which is really that of the consistency of mental processes. It lays down certain principles that it calls the Laws of Thought as Thought, and tells us that we must obey them. The insistence is a little superfluous, since we cannot do otherwise than obey them. To read them over is to experience a curious impression of unreality, especially when we note the formulæ by which they are illustrated. The Law of Identity runs, *Whatever is, is*, and is illustrated by the formula *A is A*. The Law of Non-contradiction tells us that *A thing cannot both be and not be at the same time*. Its formula runs:

$A = \text{not-}A = 0$. The third law, called the Law of the Excluded Middle, is expressed: *A thing must either be or not be*; its formula running, *A either is or is not*, or *A either is or is not B*. When all this has been said, the straightforward reader, innocent of philosophical lore, is inclined to ask what all the pother is about. He has somewhat the same experience that the old-fashioned school-boy had when he read over for the first time the axioms in Euclid. He admitted each axiom as he read it, but looked up in wonder at his teacher, and would have asked, had he dared, why Euclid had thought it worth while to write down all this platitude. The truth is, of course, that these laws owe their value to their blatant obviousness. It is because they are incontrovertible that they have force in reasoning. They supply a standard for all our thinking, even for the thinking of those who have never heard of their existence.

But this standard, though universal, is not of very much practical importance because of its very universality. What the plain man wants is some standard that keeps us in touch with the outer world, the world in which we live. The laws of thought as thought, though of universal application, have to be dealt with in each case by the thinker himself, within the realm of his own experience. They are subjective, special to us as individuals, so far at any rate as they are applied. We want some standard that can be applied by taking account of the outer world in which we live and move and have our being.

The very words used suggest the interaction

between something within and something without. The reference to the outer world suggests a world that is not without. This inner world of ours is an individual matter: each of us has an individual world of his own, while the outer world is common to us all. We may speak of the first as subjective and of the second as objective. The inner world may be said to be made up of ideas, the outer world of things; though the point is not so simple as all that. Putting the matter rather crudely, there exists in the outer world a thing called a chair, and in the inner world there is the idea of a chair. The keenest intellects in the world quarrelled for nearly three hundred years over the problem of whether there is any such thing as chair in general; whether, in fact, there is a perfect pattern of a chair existing apart from all individual chairs. Some said there was such a pattern of a chair laid up in heaven. Others said there were only the chairs that we see, and the words by which we name them. Still others held that besides the mere word *chair*, there was the idea or concept of a chair. This last is the view held to-day, and these ideas or concepts make up this inner world of which we speak.

It is important that we should come to an agreement about the nature of what is usually called an *Idea*, and sometimes a *Concept*. The two are often used as synonyms, but there is a certain more or less vague distinction between them. To begin with, *idea* is much more commonly used than *concept*. We cannot do better than accept the definition supplied by a highly respected authority,

no less a person than John Locke. He calls an idea simply "Whatsoever is the object of the understanding when a man thinks." In plain English, whatever we think about is an idea. When some people want to make sure that they are applying the right word they use both terms and say, "an idea or concept." We cannot use this cumbrous form all the time, yet many people, when they use the word *idea*, really imply both terms. A little farther on will be found a suggestion for a differentiation of meaning. For the moment we must try to make clear the meaning of *idea*. If we pay attention to Locke's definition and think about the houses and chairs and tables that go to make up the outer world, we are dealing with things; but when we turn to the inner world, we find ourselves dealing only with thoughts. At first we may be content to speak of the inner world as being made up of thoughts and the outer world of things. But we soon find that the distinction is not so easy as we believed. An idea does not merely mean the inner-world equivalent of an outside object. We can see a cup and we can see a teapot, and we can have an idea corresponding to each. But we can also see the process of pouring tea into a cup, yet there is no such *thing* as pouring. All the same, we can have an idea of pouring. Further, we have an idea of *in*, and *for*, and *alas*, and *albeit*, and *thus*, and yet there is no *thing* corresponding to any of them. These form part of the inner world because they are the objects of the understanding when we think. But they also form a part, in a queer way, of the outside world. For though there is no such

thing as *in* by itself, we find people *in* rooms and oranges *in* boxes, and the outer world would be very incomplete if we did not know what "to be in a thing" meant. So *alas!* calls up a state of mind that really exists, and *thus* indicates a particular state of some affair or other.

The feeling of vagueness thus suggested to the reader's mind will put him on his guard against a very common misunderstanding with regard to the relation between the inner and the outer world. It is not uncommon to regard the inner world as a sort of faint replica of the outer. In other words, it is sometimes assumed that the inner world in some way *resembles* the outer. This is not perhaps an unnatural reaction from speaking of things outside and ideas representing them inside. But the idea of a chair is not a picture or a model of a chair. It is sometimes said that ideas may be regarded as the furniture of the mind. From this standpoint they may be called "presented content," since they are regarded as material presented to the mind. It is this material way of speaking that suggests the notion that ideas are mere faint reproductions of what are found in the outer world.

But another way of speaking of ideas puts matters in a truer light. For ideas may be regarded as *forces*. In this connection we may speak of them as "Presentative activity," and this makes no call for any sort of resemblance. While the inner world has no *manner* of resemblance to the outer world, it has a very definite relation to it. This relation is one of correlation; the inner world *corresponds to* the outer.

It is quite true that people with a vivid pictorial imagination can make a clear mental reproduction of scenes from the outer world, but these pictures do not make up the inner world; they are mere representations of the outer. They are images, if you like, but not ideas.

A great change has of late come over the way in which ideas are regarded. There is no doubt but that in the past there was a general tendency to regard them as having a separate existence, of being, in fact, entities. Even the broad definition of Locke suggests this aspect. If ideas are whatsoever we think about, then ideas must have some sort of existence; and if ideas can be regarded as the furniture of the mind, they must be some sort of things, however ethereal. But the newer way of regarding them as forces introduces a different attitude. Formerly we used to speak of having ideas, which naturally suggested that we must have some place to put them. They were possessions. The newer way of dealing with them is to regard them not as possessions but as ways of thinking or acting. We are getting less accustomed to speak of having ideas, and are more inclined to talk of being ideas. We and our ideas are one. They are the ways in which we show what sort of persons we are.

This marks a passage from the passive to the active aspect of ideas. The old psychologists used to spend a good deal of time in showing how ideas were formed by a process of abstraction and generalisation. Under these conditions, ideas were treated as the results of a process; they were a product, and

were not unnaturally regarded as separate self-existing entities that could be classified and pigeon-holed in the most methodical and satisfactory way. Ideas were class-names, and were liable to all the laws of formal logic. They could be treated as perfectly passive, and could be manipulated at the will of the thinker in whose mental-content they found a place. They might have some definite connection with the outer world, or they might not. It all depended on which of two groups claimed them for its own, for the content of the inner world may be said to be made up of two sets of elements, one dependent on the outer world and one independent of it. The independent set may be called *a priori*. They are, as it were, made on the premises, as a result of the mind's own operations. There is nothing in the outer world to correspond to them. They are the very special private property of the mind. The other group of elements of the mental-content are directly connected with the outer world, and are called *a posteriori*. The distinction may be well illustrated for teachers by a reference to an old-fashioned recommendation that used to be made by the Masters of Method in the Normal Schools. These used to warn young people who were being trained to be teachers that they must *tell* the pupil as little as possible, and that, in all cases that admitted of it, he should be guided in such a way that he reached conclusions on his own account. The word *elicit* used to be extremely popular in school-method books, and the teacher was urged not to communicate knowledge directly, but to "elicit by skilful questioning." When we

look into the matter, we find that it is only in the region of the *a priori* that this method is practicable. If the pupil does not know who Tamerlane was, no amount of interrogation, however cunning, can elicit this information from him. On the other hand, certain mathematical formulæ, and even arithmetical "rules," can be discovered by the pupils under the guidance of a capable teacher, and that without direct reference to the concrete content of the outer world. The region of the *a priori* is one where ideas are self-interpreting, where combinations of ideas can be built up into organised wholes, without the introduction of any concrete matter, in other words, without reference to the outer world.

The point can be further illustrated by reference to the two kinds of logic—deductive and inductive. The first kind deals with the *a priori*, and can carry on its processes without reference to the outer world. If all great admirals are blind of one eye, and Nelson was a great admiral, then deductive logic tells us with perfect confidence that Nelson was blind of one eye. This happens to be true, for Nelson had the sight of only one eye. But this fact does not interest deductive logic. If the same formula is gone through with any other great admiral, say Blake, deductive logic comes to the same conclusion, and makes Blake blind of one eye. There is no good in producing the two-eyed Blake in contradiction. If all great admirals are blind of one eye, and Blake is a great admiral, then deductive logic blandly assures us he is blind of one eye. So little does this form of logic care about the outer world that it can carry on its process by

means of mere symbols, and is, on the whole, better pleased to conduct its work by means of x 's, y 's, and z 's than in terms of blind admirals and other troublesome variables. Algebra shares this preference, and supplies another realm of the *a priori*.

The inner world would then appear to have two provinces, one independent of the outer world, the other closely connected with it. At first sight it might seem that this distinction should enable us to confine our attention to one province—the infallible province. We have had the suggestion that deductive logic cannot go wrong, while inductive can. But while it is true that inductive logic gains its practical power at the expense of liability to error, it does not follow that deductive logic cannot also lead us astray. So long as deductive logic remains true to its principles it cannot lead to error. All the illustrative blunders that brighten the pages of text-books on formal logic arise from neglecting to follow the rules of the science. Inductive logic on the other hand, while it aids us in making discoveries, does so at the risk of occasionally leading us astray. In other words, the standard of truth is based upon experience of the outer world, and the inductive logician is therefore exposed to the usual errors that are inevitable in dealing with things as they are.

If we accept mathematics as one province of the realm of the *a priori*, we have no difficulty in demonstrating that error is possible in this realm. A visit to any mathematical class-room in session is enough for this purpose. But when we look into the matter we find that mistakes in the mathematical

class-room fall into two groups—those that have a definite relation to the outer world, and those that have not. In “stating” problems we are continually having to refer to conditions existing in the outer world, but in the working out of the problems, when stated, we are in a region that is independent of the outer world. Yet we can make mistakes in this second region as well as in the first. In other words, it appears that there is a place for error even in the region of the *a priori*. We have seen already that we cannot really break the laws of thought as thought, but we certainly may misapply them, and that way error inevitably lies.

There are thus two great sources of error: the first is to be found in the acquiring of data, and the second in the use we make of the data acquired. Locke, and others before him, have solemnly assured us that there is nothing in the intellect that was not first in the senses. In the process by which the senses supply us with material for thought, there is a fine field for raising a luxuriant crop of errors. But even when these have been disposed of, there is the new field provided by the use we make even of the error-free material we are able to present to our minds. Error may arise either through faulty sense-perception or through a wrong manipulation of the material presented by sense or by experience. The brute material of sense-perception must be worked up in actual experience, and the results tested by their application in further experience.

The very terms we have used suggest that a reference to the outer world as such may be a little misleading. We are not to regard it as a mere

system of mechanical forces. There is the world of experience as well as the world of things. In other words, we are as liable to the static error in the outer world as in the inner. In both cases we are tempted to picture a world that stands still, and allows itself to be examined in such a way that we can compare at our ease the inner and the outer world. But neither of the worlds will "stay put." The ideas that make up the inner world are in the same state of flux as the elements that make up the outer world.

At this point I am tempted to suggest an unrecognised distinction between two of the most commonly used terms in discussions like these. When in dealing with the inner world we have distinguished between ideas as presented content and as presentative activity; we have used the term *idea* in both cases. How would it be if we restricted the term *idea* to the elements in their passive aspect, and used a different term for them in their active? We have a word to our hand, a word that is frequently used as a synonym for *idea*, but that has often to be distinguished from it to suit the needs of different writers. This word is *concept*. Fortunately, so far as the two terms are definitely distinguished from each other, the general tendency is to emphasise the active element in *concept*. Then, the etymological suggestion of the word *idea* is that of form or image, which fits in very pleasantly with the plan of restricting the word to the passive aspect of the elements that make up the inner world. So long as we regard the elements of the inner world as matters to be considered, thought about, even

manipulated, they may well be called ideas. To be sure, this suggests a rather lifeless atmosphere, and those who are familiar with the Platonic theory of ideas will realise how this cold, motionless, lifeless atmosphere is said to mark his scheme. His difficulty, indeed, is to get his ideas into motion, to supply them with the necessary dynamic element. Now in practical exposition of any system of ideas we often want them to stand still and let themselves be examined and analysed. Why not then label them *ideas* for this aspect, and give them the name of *concepts* when we want them to show activity? Teachers especially would welcome any means by which they may have the approval of psychologists, or even philosophers, for a nomenclature that will make it not unlawful to treat mental units on occasion as passive objects of study. To be sure, we must continually warn each other about the danger of the Noah's Ark method of teaching zoology or the herbarium method of teaching botany; but each has its place when used under proper conditions.

This half-hearted plea for stuffed birds, pinned insects, and papier-mâché models of plants in the teaching process is meant merely to propitiate those who like to picture the inner world as a sort of demonstration board, on which the elements of the outer world can be set forth for leisurely study. In point of fact, we often do use ideas in just this static way, and if we follow carefully the teaching of even our most dynamic theorists we will catch them every now and again adopting the static attitude.

Leaving this suggestion of a restricted meaning of the term *idea* to the tender mercies of the "stay-putters," we come to grips with the dynamic meaning suggested by the term *concept*. The old-fashioned folks were very fond of defining, and were apt to say that unless a person could define a term he was not master of the idea it represented. But experience shows us that comparatively few people can define logically the terms they use, and yet they use them correctly enough. So the newer way of estimating knowledge of a term is to gauge how far a person can behave intelligently to the matter represented by the term. A man may be quite unable to give a logical definition of a radio-set, and yet may be able to behave himself quite intelligently in relation to such a set.

Here we have at a different stage of advancement the same problem that worried the modern psychologist when he began to consider seriously the problem of the faculties. Faced by the array of memory, judgment, imagination, and the rest, he came to the conclusion that there were no entities corresponding to these terms, though people certainly remember, judge, and imagine. Accordingly, the psychologists swept away the whole farrago of faculties. A not unnatural result of this iconoclasm was the need for some term to take the place of "faculty." G. F. Stout suggested "mode of being conscious," and clumsy as the periphrasis certainly is, it was, for want of a better, adopted by some of his compeers. Now we have reached the point at which we want to do the same for the concept as Stout and his fellows did

for the faculties. For when you come to think of it, the concept is really a sort of faculty with a limited range. Memory was a faculty of general range so far as the treatment of mental material was concerned; one could remember any sort of experience. But it was limited with regard to the treatment of any bit of experience. It had nothing to do with judging or reasoning, or even perceiving; its business was to recall, nothing more. A concept suffers a similar restriction, this time supplied by the material on which it is exercised. It might be defined as a mode of being conscious with respect to a limited area of the outer or inner world. A man may have a concept of a house, a joy, an interrelation.

Accepting this view of the nature of the concept, we might describe the inner world as made up of concepts, *i.e.* possibilities of behaving intelligently in the various circumstances that arise in human experience. So far from regarding the mind as a receptacle filled with static entities, called ideas, we regard it as the area within which certain potentialities may develop into actualities; a sort of zone within which acquired possibilities have organised themselves in such a way that the person concerned may be able to use, when required, possibilities that have resulted from his previous experience. We do not have in the mind something that stands for a chair, but we have a capacity for behaving intelligently in relation to chairs as we find them in the outer world. In the old days, girls used to come from remote country districts to be domestic servants in great houses. Often they were much

confused by the fittings in these houses. At first they could not behave intelligently in relation to their surroundings. It sometimes happened, even, that they had never seen a stair before, so when they were faced with one they were inclined to use it as a sort of ladder, and ascend it by holding on to the banisters. They had no concept of stair. It was only when they had learnt to behave intelligently in relation to stairs that they could be said to have attained the concept *stair*.

Ordinary experience proves to us daily that the co-ordination between the inner and the outer world is far from perfect. We are continually making mistakes that we would not make if, as we say, we knew more about the things we have to deal with. But the more experience we acquire, the greater the number of cases in which the two worlds work harmoniously together. Grown people do not stretch out their hands for the moon, for the reason that previous reactions have shown that the catching of the moon is not a thing that can happen in our relations to the outer world. We learn that things happen in a constant way in this world of ours, so we reach a state of mind that is based upon a general proposition that may be expressed somewhat as follows:

“This is a world in which things happen in a fixed way. For example, this is a world in which, if you wish to hit a target with an arrow, you have to aim a good deal higher than a body would expect; this is a world in which unsupported objects fall to the ground; this is a world in which the weakest go to the wall.”

The reader does not fail to notice that these three examples are not of equal validity. The truth of the first statement will depend on the knowledge the would-be archer possesses of trajectory; the second can be attacked only by those learned men who are busy to-day undermining the law of gravitation; while the third, though generally true, admits of exceptions. Obviously, then, in all three cases, there is room for error. What is the standard of truth, viewed from the standpoint of the two worlds? The answer would appear to be: the harmony of the interaction between them. So long as the action of the internal world leads to the expected result in the outer world, we are in the path of truth. So soon as unexpected results follow, we are in the domain of error.

It may perhaps be granted that the standard of truth is the fitting of things and events into their proper places in our conduct of life. Many will see in this suggestion a blunt acceptance of the philosophy of pragmatism. But for our present purpose we are not concerned with ultimate things in philosophy. We have to determine what we regard as truth, in order that we may agree about what error means. It is not necessary for our purpose, however, to explain the ultimate nature of truth. That is a matter for the higher metaphysics. What concerns us here is error in the sense of deviation from some standard that we select as of sufficient significance for our purpose.

What could be of more significance in education than the preparing of the educand to take his place in his surroundings? Whatever else education does,

it must fit the educand to play his part in the world. Whether we accept Herbert Spencer's preparation for "complete living" as the aim of education, or the newer educationists' view that education consists in so manipulating the environment as to give the educand such an intensive experience as he cannot obtain elsewhere, we find that the function of the school is to enable the educand to discover his place in the world, and to be at home there. Emphasis must be laid on the notion of intensive experience. The function of the school may be said to be to supply experience in its most condensed form. Outside of school, no doubt, the educand learns a great deal, much of it in the same form as he finds at school. But the formal education given under the direction of the educator must provide an experience so organised as to give a more intense experience than can be obtained anywhere outside of school. If this condition cannot be fulfilled, there are many of us who would agree with Dr Franklin Jones, in his *Principles of Education*, that there is no justification for the existence of the school.

The goal of this intensive experience is to make the educand feel at home in his environment, and the process followed is an organised interaction between the two worlds. The ideal educational method would be to build up from the foundation an inner world in the educand's mind corresponding to the outer world as known to the educator. But the trouble is, as we shall find later, that it is almost impossible to get an unencumbered foundation. When the child makes his appearance in this

world, he at once sets about establishing a working correspondence between what he finds within and what is thrust upon him from without. No doubt, in a vague way, and on the material plane, the parent does a certain amount of educational work. But long before the educand comes under the influence of the professional educators his inner world is "set," and he brings to school quite a considerable inner world in fairly wholesome, but definite, relations with the outer world. There are, to be sure, great gaps in this inner world that make it difficult for the child to fit himself into many of the situations that arise in school. For each new situation, new material is necessary, and it is the teacher's business to feed in such new material as it is required. Professional skill is shown in anticipating the gaps that need filling at each stage of the pupil's progress. Not only does the competent educator supply suitable material at the proper moment, but he frequently arranges that a vacuum shall appear at the moment appropriate for the filling. Indeed, the process of education may be not inaptly described as the creation of vacuums at the proper places, and the filling of them as soon as the educand has been made to realise that they exist.

To this end, the wise educator is continually taking soundings in the inner world of his educands. To be sure, no one can penetrate within the consciousness of another: for consciousness is as impenetrable as matter. But by a process of interpretation the teacher can acquire a fairly accurate knowledge of the mental-content of his

pupils, and plan his work accordingly. In a broad, rough-and-ready, metaphorical way, we may say that the pupil's mental-content and his inner world are, for practical purposes, identical; so that all the investigations that have been made with regard to the mental-content of school children are really attempts to ascertain the quantity and quality of the elements that make up their inner worlds. Let it be granted at once that we can, after all, obtain only a very crude knowledge of the inner world of others. In some directions we can reach a fair degree of accuracy based on direct knowledge and observation. In others we have to depend entirely upon our powers of interpretation, and these depend in the last resort upon our capacity to put ourselves in the place of our pupils. It is here that the born teacher comes into his own. That rare individual probably does not trouble even with the name "mental-content," and yet by a species of intuition he thrusts himself into the experience of the pupil, and lives through, at second hand, what is going on in the pupil's life. The teacher who is a genius can do this almost perfectly, the highly gifted teacher can do it sufficiently well to avoid a great many errors of treatment, and all ordinarily successful teachers are able in some degree at least to get into direct touch with the æsthetic and ethical aspects of the inner world of their pupils, as well as with the cognitive side.

It would be futile to attempt to give directions how to attain to this closer touch with the inner world of our pupils. But it is at least something to get teachers to realise that this æsthetic and

moral aspect exists, and is worthy of consideration. Too many of us teachers appear to be content to limit ourselves to the purely cognitive sides of our work, and to regard the rest as something superfluous, something that does not count, indeed something that may require to be suppressed. This point of view may be illustrated by the suspicious attitude adopted by many teachers of a bygone age towards imagination. They called it the "busy faculty," and did their best to stunt it. To-day we realise the significance and the importance of the emotional aspects of the inner world, to say nothing of its relations to desire and will. But, when it comes to a treatment of error, we cannot but feel that we are in a region where we cannot hope to attain the same certainty that we can claim when dealing with mere knowledge. People with a fine feeling for human motive and aspiration are in a specially favourable position for getting within the citadel of the pupil's personality. They belong to the same class as those saintly mystical people who, as the Scots saying has it, "get far ben wi' God." They cannot explain their mode of approach, but they know that their communion with the other spirit is real. So in a similar way the specially sympathetic teacher may be trusted to get, in his own inexplicable fashion, a useful knowledge of the inner working of his pupils' souls on other than the purely cognitive side. The ordinary straightforward teacher must content himself with the approach from the side of knowledge. Certainly no teacher should be called upon to limit himself to a purely ideational treatment of his work. Every quality he

possesses may, and ought to, be utilised in his dealings with his pupils. But it is on the cognitive plane that we can walk with most confidence, and, above all, it is on this plane that we can communicate with one another, and explain matters. Whatever can be expressed in clear ideas can be treated as common property as between pupil and teacher, and made the stepping-stone for further advance.

All this is said to explain the line adopted here of confining our treatment of errors to those on the cognitive plane. To be sure, moral and æsthetic considerations are not excluded; they thrust their way in whether we will or no. But when they do appear they will be treated entirely from the cognitive side. This is not a surrender to the position that the teacher is a mere vendor of information, and the school a mere knowledge-monger's shop. Education is now too vast a subject to be treated as a whole in any single volume, and the part we have chosen for treatment here may without sin limit itself to one aspect. A compensation for the limitation thus imposed is that whatever we may learn about error on the cognitive side may be readily applied on the moral or æsthetic. Whatever is factual in either of these makes suitable material for us here.

Obviously the mental-content forms the basis of our investigation, and fortunately the mental-content of our pupils admits of a fair degree of accurate study. We can compare pupil-mental-content with teacher-mental-content, and both with the facts of the outer world. From the very nature of the case,

the teacher's mental-content is fuller and more complex than the pupil's, and the general process of education may be said to be the enrichment and organisation of the pupil-mental-content by the teacher. We might go farther and say that instruction in a given subject consists practically in the transfer of a block of knowledge from the teacher-mental-content to the pupil-mental-content. In the process of transfer there is opportunity for all manner of miscarriages, any or all of which may give rise to error. Comparing at any particular stage the pupil-mental-content with the teacher-mental-content, the natural assumption is that the pupil-mental-content will include more errors than the teacher-mental-content *so far as the subject of instruction is concerned*. Even with regard to matters of what are called general information, the teacher is less likely to have erroneous views than the pupils, mainly because of his greater experience. But in matters outside the subjects that he teaches, the instructor has the ordinary liability to error, and may be open to correction at the hands of his pupils.

So long as we keep to matters of fact there is always a court of appeal in the case of any conflict between teacher-mental-content and pupil-mental-content. All inner worlds are built upon the outer world, and that outer world remains as a standard. The experience of teacher and pupil alike must submit to be tested by the objective standard of the outer world, what we definitively call the real world, though in the fullest sense of the word our inner world is quite as real as the outer, albeit not concrete. In a difference of opinion between teacher and pupil

on a matter of fact, a reference to the objective world is nearly always decisively in favour of the teacher, though cases occur in which, through special circumstances, the pupil has had a closer touch with reality than has the teacher; and in such cases the pupil of course must have a decision in his favour. Sometimes, however, the pupil seeks to defend his position by an appeal to experience, and here it not infrequently happens that the teacher is right, not because the pupil's experience is at fault, but because the teacher's has been wider. A pupil, for example, confidently maintained that a fountain pen does not require to be filled oftener than once a week. In point of fact, his experience warranted his conclusion. The evidence of certain classmates, however, convinced him that there was something wrong with this generalisation. Widened experience showed him that this is not a world in which all fountain pens are always content with a weekly refilling.

A prevailing source of error is this reliance upon personal experience without reference to the objective standard. People will dogmatically maintain that the post office is half an hour's walk away, without realising that it all depends on who is to do the walking. Within the inner world of any individual it may well be that it is an accurate statement that the post office is just half an hour's walk from a given point, if it be admitted that the individual's rate of walking is to be adopted as the standard. Pope wants to know:

Who shall decide when doctors disagree,
And soundest casuists doubt, like you and me ?

and so long as we remain in the region of opinion, and apart from an objective standard, the rhetorical question can receive none but a rhetorical answer. Each is entitled to his own opinion, and may say:

If it be not true for me
What care I how true it be ?

or conversely:

If it be but true for me
What care I how false for thee ?

The whole realm of mere opinion must no doubt be taken into account in our practical dealings with our pupils, but rather on the moral side than on the intellectual. The teacher's realm is one in which there must be certain definite landmarks that prevent him from going far astray. He, more than most, needs certainty. He must be no blind leader of the blind. It is said to be of the gods to know, and within his narrow range the teacher must take up the god-like attitude towards the subject that he teaches.

Thus the teacher stands in two main relations to error. In the first place he is an ordinary human being liable to all the blunders to which flesh is heir. He must face the usual temptations to error, and it is especially important that he should keep down to a minimum his deviations from truth. In many directions it is no more important for him than for another to avoid error. But professionally it is imperative that he should be as nearly as possible error-proof. In the subjects that he has to teach in school it is perhaps not too much to expect that he should be all but perfect. On this

point nearly everybody agrees. Among the many demands made by the public on the teacher is that he should have a complete mastery of the subject he teaches. To this demand the profession agrees. Some teachers speak contemptuously of the need for professional training, but all unite in treating as essential a thorough knowledge of the subject to be taught.

Teachers are sometimes spoken of as hectoring, domineering, dogmatic fellows, who go about laying down the law wherever what is called knowledge is in question. Whatever be the truth underlying the charge, it cannot be denied that the professional position of the teacher offers a certain temptation in this direction. For by the very circumstances of the case the teacher cannot help putting himself in the position of the authority on the subject he is expounding. Indeed, circumstances do not admit of his delegating to anyone his function of arbiter of knowledge. He represents the truth, and any deviation from his teaching is error. This is not to be regarded as arrogant assumption on his part. His attitude is inevitable, and as right as it is inevitable. He "can none other." In the realm of truth the teacher's domain is an *imperium in imperio*. As a man, the teacher feels as humble as the rest of us. He knows—perhaps better than most—the limits of his own knowledge, but whether he will or no, he has to accept the responsibility of omniscience in the branches which he teaches up to the point that he professes mastery.

So far as the teacher's work is concerned, "the truth" is no longer a remote, an inaccessible thing.

He is entitled to take for granted the subject-matter with which he deals, while he begs the big question of what is true and false in general. The great metaphysical problems that have disturbed, and will continue to disturb, the philosophers, need give to him as a teacher no concern. Certainly, as a man, he must take his share in the tribulations of thought; he must, as an individual, find his place in the universe. But so far as his professional work is concerned he can hand over the responsibility for the truth of the subject-matter to those whose province it is to attend to such things. The subject to be taught, what De Quincey somewhat pedantically calls the *docendum*, is something given, a mere datum.

To be sure, the teacher must do his best to secure accuracy in his subject-matter. He must be interested in it, and as a student of the subject must keep himself abreast of all its developments, but as a teacher he is entitled to throw the responsibility for the subject-matter upon others. As teacher he is an expositor, not an investigator.

The position is being worked out in the higher regions of education. For long there has been a struggle going on with regard to the duties attached to a university chair. The first professors were learned persons, who had acquired such stores of knowledge that men sought them out in order to learn from them. They had something equivalent to a monopoly of the learning of their time, and on them lay the duty of adding to their store. When universities were systematised, the double function of acquiring and communicating knowledge con-

tinued to be laid on the professors, and research and teaching came into competition. The greedy public naturally wanted both, but the professors in many cases felt that one was sufficient, and specialised, some on the lines of teaching, others on the lines of research. Of the two, teaching is the more fundamental, for, after all, the business of a professor is to profess, hold forth, teach. The very name *Doctor*, by which these early professors were known, means literally a teacher, and the privilege granted to those who completed successfully a university course was the *jus ubique docendi*, the right to teach in any university of Christendom.

The probable solution of the double demand from professors will be the separation of the professoriate into two groups, the research group and the teaching group, a solution that will amount to a victory for the teaching ideal. At present there are many learned professors who cannot communicate their knowledge, and a fair number who, while they can teach with much skill, have done very little, if anything, to "advance their subject," as the familiar phrase runs. These latter teaching persons will probably retain in the future the name of Professors, while the others, whose function is to make discoveries in their branch, will be known as Research Fellows, or some such title.

There is a considerable body of opinion in favour of ranking Research Fellows on a higher plane than mere teachers. With this we have no quarrel, so long as the two are kept in separate compartments; but when the two are compared we must see that the teacher gets fair play. My friend, Professor

Graham Wallas (himself an admirable teacher), tells us that "A young art student gains more in the studio of a good painter who is a second-rate teacher than in the studio of a bad painter who is a first-rate teacher."¹ If the good painter would abstain from teaching altogether it might be cheerfully admitted that the student would stand to gain by merely being present in the studio, but second-rate work in teaching is as fatal as in anything else. The bad painter is no doubt an exemplification of Mr Bernard Shaw's epigram: *He who can does, he who cannot teaches*. But it is too often forgotten that teaching is also a kind of *doing*, and is as much of an art as painting or poetry. No doubt the teacher must acquire as much knowledge and skill in the subject he teaches as his talent and circumstances permit, and Professor Wallas is fully justified in his claim that all professional teachers should be encouraged or even required to take up some study or interest outside of their school range, so as to keep in touch with the realities of life. But when all is said, the teacher's function is to teach, and his knowledge of his subject is in the last resort a *sine qua non* to his success in his work, but not the determining element in estimating his professional efficiency.

In schools there is not the same demand as there is in the universities for "advancing the subject." It is taken for granted that the teacher's business as teacher—leaving out of account the wider applications of his office on the side of education—is to teach, to communicate knowledge, passing on to

¹ *The Art of Thought*, p. 290.

others the work of acquiring new knowledge. The demand for mastery of his subject-matter is high, but limited. The teacher must have a very much wider range of knowledge than he will ever be called upon to communicate. One of the most widely and cordially accepted principles of education is that no one can teach up to the very edge of his own knowledge without imminent danger of falling over. Consequently it may be urged that for their own sakes, as well as for the sake of their pupils, teachers should be called upon to carry on some sort of research in their subjects. The ideal is excellent, and nothing but good will be done by setting it before our teachers, so long as educational administrators are content with such a range of knowledge as will enable the teachers to work on a basis of certainty in their classes. Such a knowledge-qualification would make the teacher error-free in his exposition. He can move about among his own *docenda* with perfect confidence, and the full assurance that no mistake will occur in his handling of the subject-matter as such. It is only in the upper reaches of his subject, reaches that do not enter into his professional range at all, that errors are possible. There he may be in doubt sometimes, and have to feel his way; but in the *docendum* with which his class-work is concerned he can claim to be immune from error—*other than that involved in the process of teaching*. For we are here brought face to face with a fact that surprises many laymen: the fact that more mistakes occur through lack of professional skill among teachers than through their lack of knowledge. In the universities there

is a certain jealousy between the instructors in what is technically called *Education* and those who deal with the other subjects that may be classed for convenience under the heading *Academic*. It is sometimes even hinted that the Professors of Education spend their time in teaching their students how to teach subjects that neither professor nor student knows. The charge may be dismissed at once with the remark that the trainer of teachers is entitled to assume that his students know the subjects they are preparing to teach. The trainer's subject is the *how* not the *what*.

Returning to the interaction between the two worlds, the inner and the outer, we have to note that in the interaction between the teacher and his class we are still dealing with two worlds, an inner and an outer, but this time with a difference. The teacher's mental-content forms a world that is inner for him, while the pupil's mental-content forms another mental world that is an outer world for the teacher. We have here two worlds that are outer to each other, and inner to themselves. Each is independent of the other, and may claim to be its own judge of truth or error. No doubt, the real outer world, the objective outside world, still exists and may be used as a standard to decide any dispute between the teacher-mental-content and the pupil-mental-content. But by the hypothesis we have made there should not need to be any appeal from the teacher-mental-content, as we have assumed it to be error-proof, so far as the *docendum* is concerned. Beyond this range the teacher of course may fall into error, and here a reference to the objective or

outer world is permissible. To this class belong all those quibbling problems that are often used by ingenious persons to bring teachers and other dignitaries to a sense of their own deficiencies. In a well-known set of verses a school urchin, when invited by the speech-making Bishop to ask any question, at once asked, "How many legs has a caterpillar got?" The Bishop is thrown out of gear, no help is at hand, and the urchin gives the answer, "Six," adding the confirmatory appeal to the objective world, "for I counted them yesterday." A teacher of English or of algebra might, like the Bishop, have given up this puzzling problem without disgrace. Not so a teacher of biology. The pupil-mental-content in natural history may well be more comprehensive and accurate than the history-teacher-mental-content; but in history this teacher-mental-content must reverse the relation; must be supreme.

On the understanding that the teacher-mental-content is perfect within the limits of the teaching range, we may regard instruction as the process by which the pupil-mental-content is brought into line with the teacher-mental-content. It is true that this correspondence between the two mental-contents may be brought about when both teacher and pupil are in error if tested by reference to the outer world; yet there may be said to be no technical error.

For example, a century ago chemistry was taught in schools in a way that is now regarded as unjustifiable. Yet pupils then got high marks for answers that would to-day be mercilessly blue-pencilled.

The pupil-mental-content and the teacher-mental-content were at that time in accord, so there was no charge of error at that time, whatever a succeeding generation may have to say on the subject.

The difference between the teacher- and the pupil-mental-content is to be sought in two directions: richness and organisation. The teacher-mental-content is not only the fuller of the two, but also the better arranged. Frequently pupil-errors arise not so much from lack of material as from awkward arrangement of what material there is. Ignorance, of course, may give rise to error, but must be carefully distinguished from error. From the teacher's standpoint, ignorance is natural and indeed normal; it is as much in place in human experience as is hunger. The removal of ignorance may be compared to ordinary physical nourishment, whereas error may be compared to disease. Passing from the one to the other is like passing from the sphere of physiology to that of pathology. Yet so prevalent is error in its manifold forms that it may almost be regarded as a sort of second nature; so it is not wonderful that, as we shall find at a later stage, teachers sometimes turn to it as a means towards an end; in other words, as a stepping stone to truth. For as no less an authority than T. H. Huxley tells us: "Truth comes out of error much more rapidly than it comes out of confusion." He goes on to complain about people buzzing about between right and wrong, so confusing the issues that they get nowhere. A person who is definitely in the wrong is in quite a favourable position to get into trouble by coming against the facts of life, and thus to be

forced into dealing with contradictions that necessarily arise in the course of ordinary experience when false ideas come in contact with things as they are.

The three states opposed to sound knowledge are ignorance, confusion, and error. Ignorance is sheer lack of knowledge, while error is deviation from truth. Between them is a sort of dusky region in which there is neither absolute ignorance nor definite error. A goodly part of our living is carried on in this twilight zone. About a great many matters we have a vague knowledge in which we do not have very much confidence. So long as we can get on with our living without having to depend on the accuracy of this hazy knowledge, most of us are only too willing to let it go at that, and not trouble further. To be sure, there are those of an argumentative turn who are always raising trouble about the exact meaning of certain terms, and calling upon themselves and others to supply accurate definitions. But even these restless spirits have to be content to leave certain regions free for the use of vague ideas about affairs that do not interest them. For it must not be overlooked that while there is a great body of people who have an excessive regard for facts as such, there are others who see nothing particularly attractive in them. Their state of mind may be inferred from the startling remark of Royer Collard: "I despise a fact." Not many go so far as this, and it is not at all certain that its author himself knew exactly what it meant. But it cannot be denied that in real life there is a vast array of facts that have no importance

for anyone. The fact that my desk is dusty has a certain importance to me and to the person whose duty it is to keep it clean. But the exact number of grains of dust on its surface is of no consequence to anybody. We have all seen groups of tourists at some popular viewpoint arguing vivaciously about the identification of the various peaks in distant mountain ranges. The onlookers who do not happen to be drawn into the maelstrom of debate are inclined to adopt a superior air and ask disdainfully, "Who cares?" But the rhetorical question is not so rhetorical as the speaker would suggest, for it rouses the desire for an answer.

There are those who maintain that it is never indifferent to which peak we attach a given name. It may not be intrinsically important that we should know accurately how to distribute certain names among a given number of peaks, but it is important that we should cultivate the habit of accuracy in the use of terms. In other words, it is not so much a matter of knowledge as of a state of mind. Those whom we call *precisians* must have their knowledge carefully classified and registered under appropriate heads, while the ordinary person is rather a *latitudinarian* in this connection, and is content to have his knowledge items in whatever form they may turn up. There are more latitudinarians in the world than precisians, and even precisians are latitudinarian in certain departments of knowledge. The teacher, from the circumstances of the case, is rather expected to be a precisian, and within the range of the subject-matter that he is called upon to teach, his bias must be in that

direction. As an ordinary citizen, however, he must be allowed the privileges accorded to his fellows. But even when exercising this privilege to the uttermost he cannot but acquire a certain sensitiveness towards accuracy as such, and speaking generally, the teacher has more need to fight against an over-estimation of accuracy than against latitudinarianism.

Accordingly in his *imperium in imperio*, represented by his carefully organised mental-content in his subject-matter, technically the *docendum*, he should be able to move about freely without any of the stiffness that inevitably results in the case of a person who is not quite sure of his facts. The teacher-mental-content in his chosen subject of the curriculum is a conventionally accepted system admitting of no exceptions and no doubts. It forms a region within which accuracy may be studied and exemplified without any danger of leading to stiffness and pedantry, since the training of ordinary life provides, in such abundance, exercise in the dealing with matters that have not been reduced to the dead level of absolute accuracy. The dusky land of things-about-which-we-need-not-make-up-our-minds-definitely is a not altogether unprofitable region for the educand, and a region within which the teacher himself must feel at home. It is the common ground on which teacher and pupil can meet on terms of human equality. It is here that easy applications can be made of principles laid down in the more severe realm of the formal instruction of the class-room.

Ignorance, the mere lack of knowledge, does not in itself lead to error, though negatively it may

produce a tendency towards error, and will certainly not provide a very useful protection against error. When the excuse is offered that they "did it through ignorance," it can be accepted only because it throws the blame on the limited amount of knowledge available. Had the culprit but known the things that the critic knew, the implication is that he would not have thought or acted as he did. Action always depends upon the number, kind, and organisation of the ideas available in the mind of the person acting. Ignorance may be said to permit certain lines of thought and action that would not have been possible had there been different ideas in the mind, or had these ideas been differently arranged.

Confusion is still more apt to produce error, since the ideas not being arranged according to any system are apt to fall into place under any scheme introduced. The fact that they have no definite arrangement implies that the ideas have not roused any considerable amount of interest, and have therefore not had that degree of attention that they deserved, in view of the fact that they are afterwards to be worked up in new connections. This would suggest that all ideas should be under constant and efficient observation—obviously a counsel of perfection. It is here that the moral element becomes prominent. When we go wrong through ignorance or confusion we may be held guiltless in regard to that particular error. But we may be treated as guilty in so far as we have allowed ourselves to get into this state of ignorance or confusion. What applies to the individual lay person applies at the second remove to the teacher. He is responsible

for the states that led the pupil into error. Accordingly, the teacher's work must include preparation for facing the problems of his subject as well as for the actual facing of them.

The relation between knowledge and error always involves a special problem in relation to morality. A person about to do a certain thing may not know the full results of his proposed action. If fuller information about these results be supplied, it may be that he will no longer persist in his action. Still, it does not follow that because he knows more about the results he will refrain from action. He may go on and perform the action thus involving moral guilt. This inevitably introduces an ethical consideration that is foreign to the cognitive aspect of the case. That old disturber of the peace, the Socratic *Virtue is knowledge*, may step in here and annoy the more tender-conscienced among us. But since we are confining ourselves as much as possible to the cognitive aspects of the problem of error, our withers are unwrung by the Socratic spectre, however disturbing in other connections his contribution may be.

Even within the limited area of the cognitive, there are many different points of view from which error may be considered, and all of them suggest something of value for teachers. Accordingly, it is to their advantage to envisage error from all possible standpoints, so as to get from it all the benefits, direct and indirect, that it may offer, while at the same time avoiding the dangers to which it inevitably exposes them.

CHAPTER III

PREDISPOSITIONS TOWARDS ERROR

LITERATURE is full of lamentations about the ease with which we can slip into error. To be sure the distress is mainly on the moral side. But even if we limit error, as we propose to do, to deviation from the law of things as they are, we find human nature depressingly liable to go wrong. The tendency towards error is not limited by age or sex or nationality, when regarded in a broad general way, but when we look into matters closely we find certain characteristic differences that are worthy of our attention. From the teacher's standpoint it is only natural that the element of age should have a special interest and significance. On the other hand, those who have written on the subject of error have had no special concern with age, and indeed have taken a pride in insisting upon the universality of the human predisposition to error. Accordingly, we shall find it to our advantage to consider what learned men have to say on the general subject and then make our own applications to the type of errant humanity with which we are particularly concerned.

To do them justice, philosophers have always had a preference for the positive side. On the whole, they prefer to speak of the pursuit of truth rather

than of the avoidance of error. This is probably all to the good, but we might write with more enthusiasm on the subject if philosophical discussions had more fruitful results on the constructive side. Philosophers do not seem to help us materially in the attaining of truth. They spend most of their time and energy in discussing what truth is. Their great science, Logic, does help to keep us straight about things that we have already learned, but it is not of much assistance in the acquiring of fresh knowledge. In fact many philosophers would agree with what one of them has said straight out: "Logic is of no service in the discovery of truth." Distressing as this confession may be in other connections, we need not greatly grieve over it here. Our present purpose is to deal with deviations from truth. For our purpose we are entitled to assume that we know the truth, and that our problem is to communicate it to others without damage.

Fortunately one of the most practical philosophers who ever lived has taken a hand in this discussion from the negative standpoint, and while suggesting a logical method that may help in the discovery of truth, has made a study of the influences that lead to error. It is only natural that in his *Novum Organum* Francis Bacon should deal with error entirely from the point of view of mature minds. At his time Psychology had not yet attained the rank of a separate science, and even in its general form was vague and crude. Had genetic psychology come within his range he might have reorganised his treatment of error so as to differentiate between the lapses of the mature and the

immature. As it is, he has left that to be done by his successors. Yet when we look into his classification we find that his big generalisations can be very easily applied to the case of the young.

He outlines four main causes that lead humanity into error. These he calls *idola* or idols, a rather unfortunate term, for it has led to all manner of fruitless discussions as to its exact meaning. To begin with, it certainly has nothing to do with what was in the hymn-writer's mind when he wrote:

The heathen in his blindness
Bows down to wood and stone.

Men do not consciously worship what is represented by the Baconian idols, and yet they become a sort of false gods that lead to error. Sometimes the term is used loosely for the errors themselves, but it should be restricted to the causes that lead to error. Learned references are often made to Plato's theory of ideas, and elaborate comparisons made between them and the *idola*. But for practical purposes it is sufficient to take the Baconian *idola* as they stand, and see what use we can make of them. In referring to them it will probably be better to stick to the English form *idols*.

The first group are known as the Idols of the Tribe. By this is meant all the tendencies common to humanity: in other words, all the ordinary forces that move human nature: but naturally these forces are considered in relation to such tendencies as lead to error. We must admit that we all have tendencies that predispose us to deviate from the straight path of truth, so it behooves us to look into

those tendencies if haply we may hit upon means of resisting them. Among these idols are tendencies like the following. We have all a preference for the line of least resistance: we love short cuts: so it naturally follows that we take the easiest way of reaching general conclusions. So common is this tendency, and so well-recognised among teachers, that a certain example has become stereotyped and is used persistently by most teachers of science. If we find that three metals that we have tested all expand when heated, we jump to the easy-going conclusion that all metals expand when heated—which is a good-going error. Again, we are all clannish, one-sided, partisan. Accordingly, we are inclined to look for and notice arguments that support our favourite view, and to neglect those that tell against us. Darwin used to be scrupulous about making a written note of any fact that he found in opposition to a theory he was working up. He discovered that it was not necessary to do more than make a mental note of facts that supported his theory. The neglect of negative instances is one of the most characteristic forms of the tribal idol.

The emotions have a disturbing influence on our mental processes. We are all liable to be led astray by our feelings. In the old Roman courts of justice this weakness was played upon to excess, and defeated the object of those that used it. When it became common for the counsel of the accused to bring the whole family of his client to weep before the judges, the emotional effect wore off. But, skilfully applied, this emotional appeal is a very effective one, and not infrequently it has a notable

effect where no deliberate attempt has been made to use it. Obviously a close study of human nature is necessary if we are to escape the snares of the idols of the tribe.

So far we have been dealing in the good old-fashioned way with the mature mind. The real subject of the old-style psychologist was the full-grown person; indeed the bias was rather towards advanced middle-age. It is only since the advent of the psychology of growth that the special claims of youth have been recognised. With regard to error, the position of the young is different from that of the mature. No doubt the fundamental laws of human nature are the same at all stages, but there are modifications that deserve careful consideration when we come to deal with the general application of the Baconian idols. While as junior human beings our pupils are liable to most of the tendencies to error that play havoc with their seniors, there are some directions in which these tendencies work more strongly among young people than among those who are mature. The passage of years brings such experiences as develop caution in dealing with the outer world, to say nothing of the inner. A long series of mistakes, each bringing its own punishment, establishes not only caution in avoiding possible error but a certain skill in dealing with error when it arises. However costly the method of learning by trial and error, it certainly is effective.

The young labour under another handicap arising out of the very nature of the case. The mature person not only has greater experience and a larger

paid-up capital of knowledge, but he has more mental and physical energy at his disposal for the treatment of new situations as they arise. It must never be forgotten that youngsters differ from their elders in the important point that life is in a state of unstable equilibrium at the earlier stages, and in consequence greater demands are made on the vitality of the young. The point that counts in a comparison between the child and the grown-up person is that while the grown-up has to live, the youngster has both to live and to grow. No doubt nature has so arranged matters that the youngster is supplied with sufficient additional or reserve force to meet the special calls made upon him, and in the great majority of cases the total supply of native energy is equal to the demand. All the same, there is a greater tendency to go wrong among young people than among those who have had more experience and who have a better balanced vital budget.

The tribal idols are severe upon those who are exposed to them without the training that inevitably comes from continuous efforts to make oneself at home in this world. Naturally the child shares all the tendencies of his seniors to go wrong, since he not only shares the inherent qualities of his race, but lives in a community and responds to social stimulus like the rest. He has had little chance of comparing his experience with that of others, so as to come to true conclusions. His inner world is very imperfectly correlated with the outer. Inevitably the child, like his elders, is beset by all the disturbing tendencies—the seeking of illegitimate

short-cuts, of labour-saving devices, the jumping to unwarrantable conclusions, the neglect of negative instances. To all these temptations to err the young put up but a feeble resistance. The inherent tendencies are powerful, and the youngsters have as yet little knowledge of the snares underlying them. At the earliest stages, children generalise with fatal facility and fall into innumerable errors. According as a child is first admitted to familiarity with a cat or a dog, he will make all dogs pussies or all cats bow-wows. It is only very gradually that experience modifies this tendency to slipshod generalisations.

The Idols of the Cave are those that belong to the individual as such. We are all apt to get closed up in our own immediate interests, and to live in a sort of cave, so surrounded with our own affairs that we do not get sufficient sidelights to keep us right about what is happening to us and around us. Our own mental and spiritual make-up determines our views on a great many matters. It is a common observation that a misshapen person is peculiarly sensitive in social relations, often quite crabbed. It is a popular belief that all dwarfs are ill-natured. Exceptions no doubt occur, but the observation is sufficiently true to be worth taking into account. In passing, I may note that in writing about this dwarf reaction I felt a curious desire that the generalisation should be true, inasmuch as it very comfortably illustrates the point I am making. In other words, in the very process of describing the idols of the cave I find myself supplying in my own experience an illustration of the working of the idols of the tribe.

Probably Bacon would include in his cave idols all the psychological peculiarities of the individual. The temperaments will each have its special way of leading to error: the sanguine will go wrong in one way, the lymphatic in another. The motor type is more likely to go astray in the way of jumping to conclusions too rapidly and with inadequate data, while the sensory is apt to be led into error by timidity and delay, and fear of trusting his own judgment. When we come to the pathological forms we find that the introvert is inclined to go wrong by brooding over inner reactions while the extrovert plunges into error through sheer over-confidence in himself and in his fellows. Sometimes the element of sex is introduced into these considerations. J. M. Baldwin, for example, maintains that men are mainly sensory and women motor. If this be so, we might expect men to have different idols of the cave from those that prevail among women. Now it is probably true that the sexes have different predilections in the matter of the cave idols, but Baldwin's classification is too sweeping. In all probability the sex distinction between sensory and motor is true as far as boys and girls are concerned, but does not hold among full-grown people.

This supplies a good text on which to emphasise the greater liability of the young to this particular type of idols. It is only natural that at the earlier stages human beings should be more dominated by their personal peculiarities than at a later stage, by which time they have had an opportunity to fit themselves into their environment, and to discount

their differences. We have all, for example, if we are to believe the psychologists, though they are talking less about this matter than they used to do, a preferred sense. Some of us prefer to acquire our knowledge through sight, others through hearing, still others through the sense of touch. This does not imply that the visiles get their knowledge entirely through the eye, or that the audiles depend solely on the ear or the tactiles on touch; but merely that each of them prefers his special sense, and would rather learn through it than through any other. In any case this bias will certainly have a tendency to expose each of the types to a rather special view of the world that must occasionally result in error.

In what follows we shall have a good deal to say about the various ways in which the mind, mature or immature, goes wrong in its pursuit of truth. But in the meantime it is worth noting that a formidable structure of error may be built up without the deliberate exercise of the mind at all. Many errors arise not from any deliberate thinking of any kind, but as the result of a sort of crude association. Things get together in the mind for purely accidental reasons, and by and by they get so accustomed to one another that they are quite at home, and the little world they form seems perfectly natural. It is only experience that makes us regard it as normal that white milk should come out of a black cow. To the child it comes as a great surprise the first time he sees this prodigy. When Huck Finn argues from a balloon that the State they see below them cannot be the one Tom Sawyer thinks it is, because

it is obviously green, whereas the State Tom is speaking of is of another colour, he is merely carrying over the crude association of the colours of the States as represented on the map. It is not an unnatural mistake for the pupil to think that Washington was born in the White House. He does not consider that there was no White House when Washington was born, does not stop to consider that, even if there were, a president is not born into but elected into that home. All the pupil had at the back of his mind was that the White House is the home of presidents, and Washington was pre-eminently a president. When the pupil wrote in his essay that in Australia wine was got from a bird called the emu, he did not reason about the matter at all. He was not greatly interested in wine anyway, and did not care very much where it came from. But the picture of the emu in a very widely advertised flagon of Australian Burgundy struck his fancy and the association was complete.

This crude association moves further up in the school scale, as is shown in the answer of the pupil who said that if we take a cubic foot of hydrogen and a cubic foot of copper the second will weigh 63·1 times the first. Here the idea of atomic weights was too much for the pupil, who took the term in its ordinary meaning and made no allowance for the reduction of each element to the same state before a comparison can be fairly made. In a case like this quite a serious error may arise in the mind of the pupil, and may persist throughout life, sometimes with awkward consequences. A great many crude associations, however, have no serious

drawbacks since they are concerned with aspects that are not of practical consequence. Nature has so arranged things that really important associations are impressed on the mind in a rather vigorous way by what happens in the ordinary course of living. So the teacher may rely upon having an efficient helper in developing important associations. But many crude associations that have no vital connection with the ordinary affairs of life may remain unchallenged up to, and in some cases during, mature life. Sometimes the association is so crude that a moment's reflection would expose the underlying misconception. When a pupil remarked in an examination paper that "When you have died suddenly you are cross-examined by a coroner," we have a case in point. Often the association is a purely verbal one, resulting from the running together of two words. "James the First took a Turkish delight in having people kneel before him" is a case in which two words had got compounded into one—ankylosed, the doctors would call it—so that "Turkish delight" (the name of a well-known sweet) came to be treated as one word. Natives of the Southern States of North America have confessed that they had reached manhood's estate before they realised that "damned Yankee" was not a single word. Many of the *clichés* against which teachers of English composition wage an unequal warfare exemplify this verbal ankylosis.

Other striking differences among individuals must have similar effects in determining the sort of error to which they are specially liable. The type of memory—rational, verbal, spatial, and so on—will

have a very definite and powerful influence in causing and manipulating error. So the sort of attention, diffused or concentrated, will give a bias to a particular kind of error. The sort of imagination is another powerful determinant.

In all these respects the young are handicapped in various ways without being quite aware of the fact. It is only at later stages that they acquire a fair knowledge of their own peculiarities. No doubt many go through life with a very inadequate knowledge of their own qualities. To be sure we have the popular saying that "a man is either a fool or a physician at forty." But observant people are not lacking who cynically ask whether it is not possible to be both at that age. For our purpose it is sufficient to use the saying as a justification for the view that at the school age human beings are specially liable to the idols of the cave, and that therefore we should be on the look out for errors arising from this cause, and be willing to make special allowance for the young.

The Idols of the Market-place are those in connection with our communications with our fellows in the ordinary intercourse of life. It is obvious that we have to deal here with all the difficulties of communicating between the inner worlds of different individuals, in relation to each other and to the outer world common to all. Naturally Bacon does not approach the problem from this angle, but he does lay special stress on words as a fruitful source of error. We are continually misunderstanding one another through using words in different senses. People often talk to one another in such a way as to

convey the impression that they understand each other quite well, and yet may end by having totally different views about what each other thinks. In a later chapter we shall go into some detail about this matter, since errors in the use of words are more common in the school than in the outside world. The idols of the market-place are particularly dangerous for young people, for the obvious reason that since the correct use of words and other means of communication depends mainly upon intercourse, and children have had, from the nature of the case, very limited opportunities for intercourse as compared with their elders, the youngsters have fewer guides and safeguards, and often err where their seniors can easily keep within the path of truth. So important indeed is this aspect of school life that Mr H. G. Wells says uncompromisingly that the chief function of the school is to foster intercourse, and to this all other functions are subordinate. The child has of necessity a very limited vocabulary, and even the vocabulary he possesses lacks that sharp-cut definiteness that marks the experienced manipulator of words. The child is apt to use vague terms that fit a great number of different objects. For example, the child, like the illiterate person, is very much inclined to overuse some such all-inclusive term as *Thing*. English hospital-nurses during the Great War were astonished at the way the word *chose* was used by the Belgian wounded soldiers. Everything was described as *chose*, to the extent that the nurses were often at a loss to follow the meaning intended to be conveyed by the term. In later life laziness tends to per-

petuate this infantile characteristic, and slovenly people often annoy their clearer-thinking acquaintances by talking of thingumbobs, thingamajigs, and what-d'ye-call-'ems. Numbers beyond certain limits have no definite meaning for most of us, but at early stages it is only natural that the incomprehensible range of quantities is more rapidly reached.

With regard to the adequacy of the vocabulary, it may not unreasonably be maintained that sufficient for the age is the vocabulary thereof. But in point of fact at any particular stage of youthful progress there is a movement upward, a striving towards expansion. We have here an exemplification of the penalties of growth. Among adults there is a certain equilibrium that frees the person from the definite strain that results from having to increase the vocabulary while feeling one's way to use effectively the vocabulary one already possesses. The ordinary adult has but to do his day's darg with the words at his disposal, but the youngster has to struggle all the time with new verbal elements that claim his attention. Till an equilibrium between the supply and demand of words has been established in his mind, the child will always be greatly susceptible to the idols of the market-place.

The final group of idols is made up of those of the Theatre. This name is likely to mislead, for it has no specific reference to the stage. These idols have sometimes been called idols of the Palace, but they might as well have been called idols of the School, the Law Courts, or of the Dissecting-room. They have to do with the tendency to error arising from

the special occupation of the person concerned. This bias is not confined to the trade or profession or other money-making craft, but extends to the social grouping of the individual according to certain specific interests. A churchman is likely to take a biased view with regard to all matters ecclesiastical, a trade-unionist on all economic affairs. The schoolmaster is well known to be inclined to error in the direction of pedantry. Wherever specific views are cultivated, there we have a meeting-place for the idols of the theatre. Sometimes there may be a little difficulty in keeping quite apart the idols of the theatre and those of the market-place. What is now called the herd instinct, the tendency to act as other people are acting, without reflecting much about whether we should do so or not, may be regarded as one of the idols of the market-place, because it manifests in the most general way the influence of intercommunication among men. On the other hand, if all real estate men are inclined to adopt one particular way of regarding land purchase, apart from its inherent merits, this is to be attributed to the idols of the theatre, rather than to those of the market-place, because the determining principle is the way of looking at things from the standpoint of the interests of occupation, rather than from a consideration of the influence exerted on each person by the presence of others. Perhaps Bacon, were he here, might object to the introduction of the herd instinct at all, but on the whole he would probably allow it to enter the market-place rather than the theatre. On the other hand, the theatre, in the sense of a playhouse, is a specially

favourable breeding-ground for the herd instinct. Frequenters of the cinema are specially liable to the idols of the theatre, since they acquire a sort of cinema-view of the world that is very apt to lead to error in dealing with the affairs of real life.

This reference to "the pictures" makes it clear that the idols of the theatre have a practical importance even for youngsters. At first sight it would seem that these particular idols, concerned as they were in the mind of Bacon with philosophical systems, would have no influence on the young. But while the schoolboy or girl has little to do with philosophical coteries and their quarrels, they come into touch in their daily institutional life with something corresponding to those systems that Tennyson tells us "have their day and cease to be." School youngsters have among themselves their points of view that really amount to a sort of junior "system." Often there is a body of "good form" that is almost as elaborate as the canons of some of the minor philosophies, with the result that, so far as leading to possible error is concerned, they are almost as dangerous as the recognised systems that roused Bacon's suspicions. Take the case of what English schoolboys irreverently call "pi-jaw." In plain words this means merely talking about religious subjects for purposes of edification. The schoolboy resents on general principles talk of this kind, and tolerates it only when he cannot help himself. He makes, however, certain exceptions. In the school chapel, and in talks with the Headmaster or his House-master on a Sunday afternoon or evening it is quite in order. This attitude obviously

leads to danger of error, by fixing beforehand the point of view from which certain subjects must be considered.

Then again the school spirit, the house spirit, the gang bias, the politics of athletics, the whole system of traditional custom, exercise a powerful influence over the thought of the schoolboys and girls, and inevitably lead them into errors of much the same kind as Bacon had in mind when he elaborated his views on this particular form of idols.

In dealing with the errors towards which we are led by the different idols, we naturally begin to ask ourselves more pointedly what sort of standard we are to set up of the truth from which the errors are deviations. Here we note that a different word now and again pokes its way into the discussion, and rouses a suspicion that perhaps there are two kinds of error towards which we are drawn by these idols. In logic we are continually hearing about fallacies, and on turning to such a standard manual as Whately's *Elements of Logic*, we read the definition: "Any unsound mode of arguing which appears to demand our conviction, and to be decisive of the question in hand, when in fairness it is not." From this it would appear that the term *fallacy* refers to the process of going wrong rather than to the result. It is true that we read of logical fallacies and material fallacies, and may be led to imagine that the second kind deal with the ordinary mistakes that we come across in everyday life. When we consult the logician, however, he tells us that the difference between the two kinds of fallacies is that in the logical sort the conclusion does not follow from the

premises, while in the material group it does follow from the premises, but is wrong for all that. Fortunately we do not need to go any deeper into this morass. The only thing that concerns us here is that the word *fallacy* is sometimes used loosely for a mistake, and is therefore frequently applied as a synonym for *error*. But it is better to keep the term *error* as signifying a deviation from a recognised standard, and as the result of a process rather than the process itself. A fallacy in thinking leads to a deviation from truth, in other words to an error.

When Bacon proceeds to work out the system by which he hoped to inaugurate a method of discovering truth, he notes a great many errors in actual existence, and regards it as of some importance to have these errors recorded and classified. He writes:

"To which *Calendar* of doubts and problems, I advise be annexed another calendar as much or more useful, which is a *Calendar of Popular Errors*: I mean chiefly of natural history, such as pass in speech and conceit, and are nevertheless apparently detected and convicted of untruth."

In 1646 Sir Thomas Browne produced his *Pseudodoxia Epidemica*, commonly known as "Enquiries into Vulgar and Common Errors," in which he tabulates no fewer than 189 common errors. They do not, however, belong to quite the class that Bacon wanted put on record, though some of them fit in well enough. There are too many examples of sheer superstition, and too much fanciful theology, to make the collection of much

use in the advancement of science. Almost exactly two hundred years after Browne's pioneer work, there appeared an additional list of forty-four popular mistakes collected by Caroline Frances Cornwall, writing under the pseudonym of *Sir Thomas Browne Redivivus*, the book being called *Vulgar Errors*. In 1897 C. E. Clark brought out his *The Mistakes We Make*, in which he pillories some 330 deviations from the truth. Evidently he was not satisfied with his catalogue, for in 1901 he produced a companion volume, *More Mistakes We Make*, in which he supplements his first indictment with forty-five additional charges. My friend A. S. E. Ackermann has gone through a somewhat similar experience with his enlightening *Popular Fallacies Explained and Corrected*. Beginning with a modest "460 Fallacies collected in Fifteen Years," he advances through a second to a third edition, this last bristling with its formidable array of 1350 blunders. He takes account of all the books referred to above, and adds to them the following: Stephen Fovargue with his *A New Catalogue of Vulgar Errors* (1767), embodying in all thirty-six; John Jones, M.B., with his twenty-one errors listed under the title *Medical, Philosophical and Vulgar Errors* (1797); and the voluminous John Timbs, F.S.A., with his galaxy of five hundred, under the plain heading of *Vulgar Errors* (1840). Mr. Ackermann is my authority for the number of errors exposed by all the above writers.

If the reader cares to cast his eye over the titles quoted, he will note that five out of the seven books include the word *Error* in the title, while two of

them content themselves with the word *Mistakes*. Mr Ackermann differs from the rest in introducing the term *Fallacies*. It is doubtful whether this is an improvement. It cannot be denied that a case may be made out for the innovation, but on the whole it seems safer to confine the word *fallacy* to the process by which we go wrong, and use the word *error* for the resulting deviation from the truth. Mr Ackermann might justly call in the support of Charles Lamb and his *Popular Fallacies*. But Lamb does not supply a list of recognised errors. Many of his fallacies could at least be questioned, and in point of fact this series of essays forms really a collection of arguments in favour of Lamb's new reading of various popular ways of expressing current public opinion. On the other hand, when we read one of Mr Ackermann's fallacies there does not seem to be much left to argue about: his decision must be accepted as final. In other words, he has demonstrated in each case that he has exposed what must be admitted to be an error.

It is not to be inferred that the teacher is not concerned with the process that leads to error. On the contrary, we shall spend a good deal of time in looking into this matter, and in using whatever knowledge we may acquire to guide us in the treatment of the errors with which we must deal in school. In point of fact we shall find that a good many errors do not originate in a logical process at all, and are therefore ineligible for the name of fallacies. Such errors have to be dealt with in our ordinary school work, though it must be admitted that they are not so interesting as those that we can

analyse from the standpoint of reason, calling in the pupil as a partner in the process of unravelling the rational basis of the blunder.

In any case we shall find that our field of operations differs materially from that of the authors of the books above referred to. Not only do we treat of people of a different age, but we have a different aim and must use a different method. The cataloguers of errors are content to make their list, present the correction of the error, and leave it at that. Bacon, no doubt, takes a wider view, and goes to some extent into causes. But the others take the error as they find it, and are satisfied if they can put the public right. Readers of Mr Ackermann in particular cannot but be grateful for the correction of many errors that had formed a part of their mental stock-in-trade. But his book as a rule deals only with errors as they are, seldom gives an explanation of the process by which they arose, makes no provision for preventing the recurrence of similar errors. Books of popular errors deal with their subject in a purely static way. They may be regarded as text-books may, and have the same relation to the pupil as the text-book has. The book says what it thinks necessary to be said, and stops there. The teacher, on the other hand, introduces a dynamic element. He deals with each new factor as it arises, and deals with it in direct relation to the circumstances then existing. Accordingly, the teacher must take a wider view of his problem than do the cataloguers of errors. He must be keen on causes and cures. The incidence of his attention and interest is to be on how to

detect errors as they arise, how to deal with them when they appear, and how to prevent their recurrence whether in the same or in a different form.

This preliminary study of errors in general is preparatory to a treatment that will have special reference to the errors that occur in school in connection with the ordinary subjects taught there. The study must be continued for a little on the general plane, since it is necessary to lay a good foundation so that we may understand the workings of the mind in their relation to the errors that of necessity accompany all mental process and that are naturally most prominent at the early stages of life. The teacher is no doubt appalled at the range within which his pupils can go wrong, and is apt to take the range of the subject-matter as determining the possibilities of error. But there is a compensating circumstance that may bring comfort to the harassed teacher. While the possibilities of error seem almost infinite, it is possible for the professional teacher to limit the range within which his activities have to be exercised. It is possible to secure a region within which he has to deal with certainties, and therefore to avoid the wear and tear of mind involved in discovering what is the truth. The range of school subjects is mercifully restricted, so that the teacher need not worry over the positive supply of truth, but may confine himself to the study of the various ways in which his pupils may wander from a standard deliberately set up by himself.

Within his own subject we have seen that the

teacher can claim sovereignty; he is within his rights in treating the subjects he teaches as a kingdom of his own included in the wider kingdom of knowledge. To obtain mastery in this definitely restricted domain he must work hard and go through many tribulations, but by the time he comes to exercise his profession he has established his position, and may claim to speak as an authority. So far as the subject-matter is concerned, he has passed through the period of Storm and Stress and has reached calm seas. Whatever troubles he has to fear come from the professional side, not the side of knowledge. Some teachers hold that once they have mastered their subjects they have nothing further to learn. But most acknowledge that the mastering of the subject-matter, the *docendum*, is only the beginning of the business, a mere preliminary to the real work of the class-room. It is, however, of the very essence of professional qualification, and is a *sine qua non* of success.

Some years ago in London, when I happened to be specially interested in the qualities essential to success in teaching, I put this question unostentatiously to as many men and women teachers as I encountered in ordinary course: Which qualities do you regard as essential to success in our profession? Somewhat to my surprise, I found that the answers had a tendency to fall into a formula. Some of the teachers became garrulous and launched out into what I could not but suspect was a memory of certain ponderous university lectures. But most of them were commendably brief, some of them even epigrammatic. As a rule just two qualities

were mentioned, so the formula may be represented by $a+b$, where a almost always stood for "A knowledge of his subject," and b for some other outstanding quality. Some of these b 's ran "and a firm upper lip," "and a square chin," "and a sense of humour," "and the patience of Job," "and sympathy." In one case b ran significantly: "a certain easiness in being bored."

What interests us here is the unanimity with which a knowledge of the subject was put in the forefront. We may take it for granted then that the profession accept it as a principle that any teacher who hopes for success must be master of his subject. But while in this respect the teacher must be regarded as sailing in calm seas with the help of a good compass and the resource of a reliable anchor, he has still certain dangers to face. These are not concerned with subject-matter but with the mode of presenting it: getting it over, in fact, into the minds of the pupils.

In this process the teacher is liable to certain special forms of error that come from his professional status: idols of the theatre, in fact. Naturally this subdivision of the theatrical idols claims our attention here, for any tendency that leads the teacher astray has a direct influence on the pupils. So important is this aspect that Mr Francis Storr and I arranged a series of articles for his paper, *The Journal of Education* (London), on this matter, and these appeared in the years 1907-08 under the title *Idola Pulpitorum*, or *The Pitfalls of the Practical Teacher*, in the Introductory article of which series I set forth the general idola, leaving for the other

contributors the detailed application to the ordinary school subjects.¹

Of these professional idols, the Idols of the Teacher's Desk, probably the most important is the tendency to overteach. It is a common complaint that in schools we teach too much: but the reproach is ambiguous, and is often understood in the sense that we teach too many things. This no doubt is true: but the complaint may bear another meaning and signify that we do too much actual teaching. We carry on the process to too great lengths. The Wordsworthian quatrain has a notable lesson to us teachers:

Think you amid this ceaseless hum
Of voices always speaking
That nothing of itself will come
But we must still be seeking.

The truth is that most of us like teaching, and actually enjoy the process. Indeed one reason why the Dalton Plan will never become fully developed is that teachers will never surrender the right to give direct instruction. Probably the merits of the Plan will win a partial acceptance of it over wide areas, but your true teacher will fight for the right to exercise his function in his accustomed way. Indeed this love of the give-and-take of class-room teaching is only a special manifestation of an all-but-universal human tendency: the desire to express oneself. It is sometimes said that the teacher's besetting sin is talking too much. As a rule the

¹ In the *Journal of Education* (London) there appeared in 1914 and 1915 a supplementary series called *Idola Linguarum*.

teacher does not realise how much of the fifty-minutes period he occupies in talking, as compared with the time allowed for his pupils to express themselves. When asked to estimate the amount of time they have occupied in talking during a fifty-minutes period, teachers usually guess between twenty and twenty-five minutes, whereas in point of fact it is quite likely to be thirty or thirty-five or even more minutes. Actual stop-watch observation often produces surprising confirmation of this high estimate. The cause of this excess of talking is not at all discreditable to the teacher. It often arises from the confused and distressed look of certain of the pupils. The teacher infers that they are not understanding what he says, so he goes on expounding in the earnest attempt to get his matter into their minds. He is inclined to think that he has not yet reached the minds of certain dullards, so he goes on, to the despair of the abler pupils and the confusion of the average pupils, who, noting the enormous amount of explanation, run away with the impression that there must be something more in the matters discussed than they had thought, otherwise they would not need such an inordinate amount of explanation.

The second of the idols of the desk is in some ways the opposite of the talking idol. It consists in taking it for granted that because a subject has been taught it has also been learned. We are apt to forget that the work of the class-room is bi-polar: it has the teacher pole and the pupil pole. Teaching and learning are correlative processes, when the class-room work is successful. But it is possible

for the teacher to go through a process that he calls teaching, without the pupil really learning anything. Old David Stow, the founder of the Training System, used to bore his students at his Glasgow Training College by exclaiming in season and out of season: "A thing is not given till it is taken: a lesson is not taught till it is learned." It is an example of the working of the idols of the teacher's desk that we are apt to take it for granted that if the process of teaching is gone through, the state of having been taught inevitably results. The teacher may without sin, and purely for histrionic effect, exclaim: "Why, you are not going to tell me you don't know *that!* Didn't I tell it you only yesterday?" The air of pained surprise is all to the good, so long as the teacher realises in his own heart that he has no right to take it for granted that one telling is always sufficient.

A third of the idols of the desk is to be found in the tendency to form a false estimate of the pupil's effective intelligence. This works in two ways, according to the teacher's temperament: he either overestimates or underestimates according as he tends towards optimism or pessimism; and both tendencies are dangerous. The optimist often shows his bias in the use of the word *therefore*. This is most frequently illustrated in the mathematical subjects. The teacher will write down a line of mathematical symbols, and after putting down the three dots that indicate *therefore*, will add another line. To him, and to some of his brilliant pupils, all this is in order: the second line does follow logically and inevitably from the first. But for the majority of the class

it may demand three or even four interpolated lines before the reasoning becomes quite clear. The pessimistic teacher is inclined to reverse the process and put in too many *therefores*. Of the two, the optimist is less likely to do serious harm. For if a teacher persistently "talks over the heads of" his pupils, he will get clear and rapid intimation of the fact. His pupils cannot hide their failure even if they would, and as a rule they have no compunction in making known their inability to supply the interstitial matter between the limited *therefores*. So a remedy must be at once supplied. On the other hand, the teacher who is lavish with his three dots, and "talks down" to his pupils, may do a good deal of harm of which he gets no immediate notice. To begin with, the pupils get into the way of "waiting for the second bell," as one teacher neatly put it. That is, they know that the explanation will be long and full, and will involve a good deal of repetition. So there is no special need to give immediate and intensive attention. Thus a leisurely, not to say slovenly, attitude is encouraged among the average pupils, and particularly among the dull. On the other hand, we have seen that the clever pupils sometimes get a little bemused by the steady repetition of the points to be taught. The extravagant dispenser of *therefores* is fortunate if his better pupils escape with nothing worse than a touch of boredom. To balance this, the teacher who expects a little too much from his pupils is kept within bounds by the continual drag of the slower pupils, while at the same time getting the best out of those who can go faster than the average.

To be sure there must be a balancing of the different forces at work, and an organising of their application so that the best available compromise may be reached with the minimum amount of resulting error. Accordingly, the teacher must be always on the alert for ways of getting at the possibilities of his pupils so as to reach the desired maximum pace consistent with the best work. Naturally he welcomes all the new mental tests and attainment scales for the help they give him in reaching something that is moving towards an objective standard by which to estimate the possibilities of his pupils. But while all that is being done in this direction is to the good, the eager teacher would like something more. In estimating the human material with which he has to work he always turns an envious eye on the scientist with his instruments of precision. In particular the physicist leads him close to a breach of the tenth commandment, for something equivalent to a thermometer is what the teacher really demands.

Resisting the temptation to look into the alluring suggestions held out by enthusiastic speculators in the psycho-physical field, let us turn to the region of the metaphor while the more practical machine-makers are developing their actual instruments. We must content ourselves with a makeshift means of measuring up the elements with which we deal. The instrument that we propose to use in this temporary way does not exist, but it has at least reached the dignity of having a name. The *Phrenometer*, or mind-measurer, is merely a figure of speech. It is a metaphor in which something

like a thermometer is imagined to have two fixed points. The lower region of the phrenometer is supposed to represent the *zone of observation* within which we carry on our lives without the need of deliberate reasoning. When we say, "I see it is going to be a fine day to-morrow," we have not reasoned deliberately, we know all the conditions so well that we can come to our conclusion without any intervening argument. As soon as we are in doubt, however, or if someone questions our conclusion, we have to consider matters and give reasons. The moment this occurs we have reached the *Inference Point*. As a matter of fact we carry on most of the affairs of life on the observation zone; we see or hear certain things and as a consequence we direct our lives in a certain way, without any need to call in logic in any form. Above the inference point there is the inference zone within which all that we experience is carried on by the aid of deliberate thinking. The more thinking a situation needs the higher up in the inference zone must the work be conducted. Finally a point is reached at which logic fails us: we can no longer make an inference; we have passed beyond the inference zone altogether, and have reached a point that may be called the *Gaping Point*. For when we have reached this point, we do not know what to do, or even what question to ask. We have got to what the French call the end of our Latin. When the question is asked: What do we do then? The only answer is *Gape*. In real life, what we do is to give up the subject for a while, think of something else and hope that by and by something will turn up

that may enable us to begin again asking useful questions.

This figure is introduced here to warn us of the ways in which we may lead to error among our pupils. We have first of all to realise that the points on our phrenometer may not at all coincide with those on the scale of our pupils. We carry on far more of our ordinary living on the observation zone than our pupils possibly can. Our inference point in all school subjects is notably higher than in the case of our pupils. On the other hand, the Gaping Point is usually (and in our school subjects invariably) lower in the child's case than in our own. There are certain subjects in which it is very easy for all of us to reach our gaping point. Talking of the *Chanson Roland* to a successful stockbroker of average type, a Professor of Mediæval French would reduce him with startling suddenness to the Gaping Point: while by changing the subject to the stock exchange, the stockbroker could with great ease turn the tables on the professor. The intelligent teacher will find the phrenometer figure of some use in avoiding many errors and in understanding those that do come.

One of the most deadly of the *Idola Pulpitorum* may be named quite simply *pedantry*. This has two forms, one based on subject-matter, the other on method. When the word is used in ordinary connections it applies more to subject-matter than to professional method. For the truth is that method in its technical sense in educational affairs is a comparatively recent thing, so far as the great body of teachers is concerned. The old idea was

that all a teacher needed to know was the subject he was to teach. Given that, all the rest would be added unto him. It is true that when a school-master is described by Shakespeare or other old writers there is a sneer at his method as well as at his quaint useless knowledge. The way in which Holofernes presents his learned nonsense is as contemptible as the nonsense itself. So we may neglect the mere pedantic subject-matter and come to the pedantic way of presenting it. One would think that practical teachers of to-day had got far beyond the range of the quibbling verbal critic. Indeed the critics of teachers to-day are much more in danger of the charge of pedantry than the teachers themselves. We are no longer pedantic in the way that proves profitable for the writers and draftsmen on the comic journals. But there remains a solid tendency to what may be called underground pedantry. We are all more or less alive to the need for new developments and improvements in our school method, and we go about our investigations and experiments in a business-like and vigorous way, leaving no room for the energies of the critical scoffer. But as an almost inevitable result of this specialised work, we are tempted to take our investigations too seriously, and to insist unduly on the observance of details. It is true that, in America at anyrate, there is a sort of loophole left, a means of working off excess of enthusiasm, before it goes too far. This is found in the readiness with which a new method can be dropped as soon as it begins to get irksome. This is not said in any disparagement of the American rhythmical enthusiasm.

It is true that American educational history is paved with the remains of forgotten educational fads. But those ripples on the shore of the great educational ocean merely record the many tides that have come and gone; and as with the rising tide on the seashore, we have continual ebb and flow, but a steady advance all the same. All those fads that have had their day and ceased to be, have left the rising tide of educational progress a little higher than it was before. Nevertheless, there is always the danger of the pedantry that is represented by a too close adherence to the details of a scheme excellent in itself. It is a human tendency to emphasise the *details* of any movement or process that has roused enthusiasm. A certain ritualism frequently marks any new system, particularly if it is accompanied by the use of pieces of apparatus. Take, for example, the Froebelian system. No one could begin with a wider or broader scheme than Froebel, yet, as he went on, his Gifts and Occupations and Games began to take on a certain sacredness. A sort of pharisaical educational punctilio came to dominate the method, and the details gradually tended to kill the fine spirit that underlay the whole. So with even the broad scheme developed by Dr Montessori. Her apparatus soon began to subtend too big an angle in her mind, and in the minds of her followers. The old-fashioned way in which *Notes of Lessons* used to be drawn up in the British Training Colleges gradually became so stiffened that they choked initiative on the part of the students, who lost all power of conceiving any notes drawn up under other captions than *Heads*,

Matter, Method. Accordingly, when the Herbartians came along with their Five Formal Steps they were welcomed as the saviours of the freedom and initiative of the teachers. But, alas! the Five Formal Steps in their turn became exhausted, and put on the jailer aspect, with the inevitable result that they in due course went to the place prepared for exhausted forces.

It will be noted that the idols of the desk are mainly concerned with method, which is only natural, since method is the general term applied to the process by which the *docendum*, the thing to be taught, is communicated to the pupil. So important is this process that it has come to form the basis of the professional training of teachers, and in the opinion of not a few its study has resulted in a certain sterilisation of initiative. The very word *Methodology* has acquired a connotation in which pedantry has a rather prominent place. Even the name by which the earlier institutions for the training of teachers were known, *Normal Schools*, indicates the fundamental position assigned to the rule by which teaching was to be guided. Everything had to be done "by line and level," and it has to be admitted that the teaching fraternity as a whole lends itself very readily to a more or less rigid ritual. Teachers are popularly regarded as only too willing to adopt hard-and-fast ways of doing things. To use a quaint mode of expression favoured by the coloured people of America: *Methodical* "is what teachers are nothing else but."

To be sure there are teachers who go to the

opposite extreme and deliberately neglect method as such. It goes without saying that some sort of method must be maintained if anything like systematic teaching is to be carried on. But some people are constitutionally incapable of sustained method, and these have a tendency to sprawl all over their subject while teaching, and thus to produce a rich crop of errors among their pupils. As a rule such teachers do not find fault with method: they are not deliberately unmethodical. They merely follow their natural bent. On the other hand, there is a group of teachers who definitely condemn method, and make much of their claim to freedom in teaching along their own lines. There is not much fear of this group going far wrong. In general they are not really averse to method, but only to having method forced upon them. What they want is to be left free to follow methods of their own, and in this respect they represent a very wholesome tendency. What is needed is sufficient freedom to allow the teacher to bring out the best that is in him, and sufficient method to prevent him from wasting his efforts by lack of systematic application.

What is wanted is a balance between matter and method in the teaching process. Since the matter, the *docendum*, may in our considerations be taken for granted, our interest must centre in the process of communicating it with the minimum chance of leading to error on the part of our pupils. Accordingly, we are wise in looking into the views of Bacon and other thinkers who have considered this matter of error, and to learn from them, not merely in

connection with our pupils' tendencies, but our own. The idols that influence our pupils are not without effect upon ourselves, and we shall do well in keeping them before us in our examination of the process of building up the inner world of our pupils.

CHAPTER IV

THE BUILDING OF THE INNER WORLD

THE inner world of every man is the result of his experience up to the moment at which we begin to look into his case. It is the paid-up capital of knowledge, by the application of which he carries on his life. We have seen that this inner world is not a copy or a replica of the outer, though it is so built up that it fits into the conditions of this outer world, and we have to be continually on our guard against taking too concrete a view of it. Whether we will or no, we are all tempted to give to this potential world of ours a real concrete existence in time and space. This tendency towards concreteness in the wrong place is not confined to our treatment of our inner world, but is a general tendency towards error, a tendency that is so common that it has had a name given to it by philosophers on the look out for error in thinking. When they talk about *hypostasis* they mean the assumption that there is an entity or being where there is no such thing, but merely a thought. The poet and the scientific man in the legitimate exercise of the imagination are perhaps entitled to hypostatise. No one grudges to the poet the licence that he claims when he "gives to airy nothings a local habitation and a name." He does no harm to any-

one. Nor does the scientist with his perhaps fanciful hypothesis, for in his circle of thought he is continually applying tests and controls to whatever licence he permits his imagination. But in the region of thought we must be always on the alert lest we should be tempted to imagine real things where nothing but thoughts exist. For example, we are accustomed to speak of the mental-content of our pupils, meaning the ideas they have at their disposal. But the very phrase suggests a collection of ideas gathered together in some receptacle; the mind is regarded as the container and the ideas the things contained. Matters are not much improved when we speak of ideas as the material out of which the inner world is built. Indeed, the whole figure of building up an inner world almost irresistibly suggests a vast group of separate and independent entities which have to be combined into a structure. There is a hint of bricks.

This suggestion becomes intensified when we find a convenient unit for the building process. This is the *idea* which supplies a temptingly appropriate atomic basis for our inner-world building. To be sure, there is a disturbing difference of function suggested by the two different ways in which we have seen that ideas may be treated. From one standpoint they may be regarded as the mere individual elements that make up the mental-content. Ideas thus regarded may be styled *presented content*. They form, as it were, the furniture of the mind. They "stay put," and do not interfere of their own initiative with the building process

that produces the inner world. On the other hand, the ideas may be treated as forces that take an active part in all mental process. Viewed in this light, the ideas are treated as having "presentative activity," and we have suggested that the term *concept* might be restricted to this form. As to the nature and source of this activity, we shall have more to say at a later stage, but at the present moment it is evident that the presence of this power complicates the position materially. We can readily conceive of building up passive elements, such as ideas are represented to be when they are treated as presented content. It is quite another matter when they present themselves as having an activity of their own; as concepts, in fact.

It may quite fairly be asked: Can we build forces? Can concepts be treated as building material? This is one of those awkward questions that inevitably arise out of a metaphorical mode of treatment. The answer is to be found in an examination of the nature of the force in question, which will be made in due course. We shall find that the force has its source in a quarter that enables us to manipulate it in the process of building the inner world of our pupils. In fact, were it not for the existence of this force we would be left high and dry with our static mass of presented content. It is the presentative activity of the mental units that supplies the driving power by which the teacher controls the building process in the minds of his pupils.

Having duly warned ourselves of the possible dangers of hypostatisation, we may now proceed to consider the actual building. How are the ideas

and concepts obtained in the first place, and how are they built up into that inner world that belongs to each one of us? The answer is, by the natural and inevitable process of living. Our senses are continually pouring in first-hand material, which our mental reactions are continually working up into organised wholes that have definite useful reactions to the outer world. By merely being in and of the outer world we of necessity start to correlate the inner and the outer. The relation between the two worlds is a matter for the individual. So far as the two are found to fit into one another in the experience of the individual the result is satisfactory. Every time that hitches occur, there is discomfort and the need for adjustment. Every misfit in the interaction between the two worlds indicates an error somewhere and demands the removal of that error. Smooth working is always being sought, and this leads to steady and almost automatic removal of the errors. Sometimes the correction is made consciously, often unconsciously. Accordingly, the building up of the inner world is carried on sometimes wittingly, sometimes unwittingly. From the moment the baby comes into the world which he finds to be, according to Professor James, "a big, blooming, buzzing confusion," the process of building the inner world begins. Mistakes are being constantly made all along the line, and are being corrected with more or less skill according to the natural qualities of the baby in question. No doubt the mother takes a hand in the game, and does her best to keep the little one out of error. As time goes on, the father takes an

increasing share in directing the building process. By and by the turn of the school comes, and the teacher is faced with the problems that this book discusses. Now, if babies were perfect, and fathers and mothers too, the process of inner-world building would go on steadily all the time, without any breaking down or trying back. But unfortunately the universe is not constructed on these principles.

John Amos Comenius earned the gratitude of all teachers on the day that he suggested the description of a school as *officina hominum*, a workshop where men are fashioned, a forge where humanity is welded into shape. The analogy is striking, and within limits justifiable, but like all analogies it breaks down when closely pressed. It is unreasonable to expect an analogy to hold down to minute details; but when it collapses at a point that is of importance to the subject it illustrates, the time has come to discard it. Comenius' analogy implies that the schoolmaster, like the blacksmith, gets his raw material in such a form that he can weld it as he pleases. It is assumed to be passive, comparable indeed to the clay that another familiar analogy makes plastic in the hands of the potter. Unfortunately, the schoolmaster does not get passive material, does not even get raw material. By the time pupils come to school they are not only not passive, like iron or clay, but they have been already to some extent worked up. The schoolmaster can never begin quite at the beginning. Rousseau reminds us that education begins with the first breath that the child draws, and Froebel goes a step further back, and suggests in his dreamy way that it should begin

with the Annunciation. The eugenists would carry the thing to a still more remote past, and tell us that the child's education began æons hence. From this fatiguing conception it is a relief to turn to the practical problem of things as they stand.

Once I heard an interesting wrangle between a tailor and a shoemaker, the point in dispute being the relative dignity and importance of the two trades. The pair maintained a not unequal struggle, till the tailor used what appeared to be an unanswerable gibe: "At any rate, I never knew a tailor that would not rather make than mend." For some reason, the shame of lucrative cobbling seemed to crush the shoemaker; in any case, at that point the discussion came to a sudden end. We teachers must perforce share the cobbler's shame. We would like to be makers of men, but have to content ourselves with being menders. If we must have a Latin name for the school, it may be fairly called *sarcinatorium hominum*, a place where men are cobbled. If the teacher could begin at the beginning and go right on, he might have a plausible claim to be a man-maker. But not only does he not begin with virgin material, he does not even have that material to himself. Other influences are continually making themselves felt, and he has frequently to put up a fierce fight to maintain the effects he has been able to produce. Sometimes, it is true, we teaching folk make a little capital out of this complication, and point out to our critics that we cannot be held solely responsible for the products of the schools, since our pupils are liable to so many extra-mural influences. But even if we

were supplied with virgin material, and had the field entirely to ourselves, being the erring mortals that we are, we would be unable to avoid mistakes, and would have to try back continually so as to put them right. Thus it comes about that education, even under the most favourable circumstances, is never quite a forthright process. The pupil has frequently to unlearn things that he has learnt, and even has been taught. Education in practice, therefore, is a process of combined destruction and construction. Optimistic teachers sometimes comfort themselves by arguing that, after all, this back and forth process is not without its advantages. From having to unlearn something in order to get at the truth, we acquire a fuller and richer knowledge of the matter involved. We move upwards, as the Hegelians would tell us, by an endless series of reconciliations of oppositions.

The building of the inner world is really a process of making ourselves at home in our surroundings. We are all at it whether we will or no; partly of our own initiative, partly under the control of others who have an interest in our development. The one essential in the process is internal harmony. The elements of the internal world must be at peace with one another, and also with the elements of the outer world. Our minds must work in such a way as to enable us to behave intelligently in relation to what goes on in the world around us. Even the man in the street realises in a vague way the existence of the two worlds, the inner and the outer, and does not find it very difficult to admit that the elimination of error is largely the problem of harmonising

the two worlds. When this idea is elaborated by the more practical type of educational thinker, the view emerges that the essential work of the educator is the building up of the mental-content of the educand in such a way as to bring it into harmony with the facts of the outer world. In educational writings we find a phrase that indicates a realisation of this point of view. The underlying notion is not a novelty, as found in his writings, but Herbert Spencer was the first to use a phrase that suggests the turning of fact into faculty. At first sight it seems silly, in spite of this high authority, to talk of turning an external fact into a power of the mind. But what is meant is merely that each new experience we have of the working of the nature of things in life leaves an impression on the mind by modifying the mental-content. The man who knows the multiplication table is different from what he was before he acquired that knowledge. In most cases, outsiders are unable to detect any difference between a man who understands the nature of the law of gravitation and one who does not; but there is an appreciable difference all the same. The two men cannot look upon the world in exactly the same way.

The peculiar phrase, "fact into faculty," becomes a little more intelligible when we look into the ordinary reactions by which we find our footing in life. If a man behaves in a satisfactory way towards his environment, it is because he has assimilated the concepts bearing on those parts of his environment upon which his life activities make it necessary for him to react. We must accordingly look into the

process by which a correlation is established between the inner and the outer world. In his dreamy but suggestive way, Froebel was fond of using two correlative phrases that helped him in expounding the process of acquiring knowledge, and that illustrate rather happily the point we are here treating. When the youngster sets about examining his surroundings and taking note of all that he observes, he is obviously taking in material, and therefore justifies Froebel's phrase, "making the outer inner." On the other hand, when the child by working up his mental-content sets about acting upon the outer world, he is exercising quite a different function, one that may not inaptly be described in the Froebelian phrase, "making the inner outer." These two processes are at work all the time, and between them constitute what we have called world-building.¹ The farther this process goes the more smoothly the interaction between the two worlds works, the more accurately the individual understands the possibilities of the outer world, and the more skillfully he manipulates them.

For convenience' sake we have treated the elements of the material out of which the inner world is built as ideas. As a good working definition of idea, without too technical a bias, we have already decided to accept Locke's, "Whatsoever is the object of the understanding when a man thinks." We are fortunately not called upon here to enter into the quagmire discussion of the problem involved

¹ For another aspect of this process see Dr E. C. Moore's annotated edition of Thomas Davidson's *Education as World Building*.

in the statement that there is nothing in the intellect that was not first in the senses, for as Locke naïvely remarks, he takes it for granted that all men will admit that we have ideas. As to the two kinds of ideas distinguished by James as transitive and intransitive, we do well to take account of the distinction, as it helps us to discriminate between the different ways in which they react in the process of world-building. Ideas on which we can pause are of the substantive order, while those that exist only as passages from one substantive idea to another are transitive. Speaking generally, nouns and verbs belong to the first class, while prepositions and conjunctions represent the second. Adjectives and adverbs occupy a sort of intermediate group, with a tendency rather towards the intransitive. It may be said in a general way that the inner world is built up out of material supplied by the outer world, though no doubt the mind supplies the cement and other accessories.

The ideas, however acquired, are worked up into combinations that make it possible to deal satisfactorily with the outer world. These groups of ideas need a name. The old-fashioned Herbartian term was *Apperception Mass*, but this is regarded as pedantic, and as involving a theory that need not be thus thrust upon the ordinary reader. *Complex* is an excellent word for our purpose, but unfortunately it has been captured by the psychoanalysts, who have attached to it a bad connotation. With them it nearly always implies a pathological connotation, that is out of place in connection with ordinary wholesome school work. *Constellation* is

sometimes suggested, and is in itself pretty enough, but somehow suggests a rather scattered group, whereas the notion to be conveyed is that of a well-organised and compact body made up of more or less disparate elements. One is sometimes tempted to adopt chemical nomenclature and speak of atoms and molecules, but the terms are somewhat technical, and had better be passed over like their astronomical parallel. *Idea-cluster* may be acceptable, since it is simple, and is at any rate free from controversial contacts. If we are permitted to drop the word *idea* or its dynamic equivalent *concept*, taking it for granted, and thus speaking simply of *clusters*, we may save space without paying for it by obscurity.

The clusters are of course of different sizes and of varying importance in the conduct of life, but they are all the result of direct interaction with the outer world, and are in fact the paid-up capital accruing from that interaction. Obviously, then, it is of the first importance that we should understand how these clusters are formed, and how they act when formed. Each cluster corresponds to some set of recurring groups of stimuli, creating what may be called a situation. In order that we may be able to meet these situations as they arise, there must be a certain coherence in the relevant clusters that will secure a permanent background, against which we may project the demands of each new situation as it arises. For example, the experienced teacher has such a thoroughly organised cluster dealing with his class-room that he is able to face with equanimity any situation that may there develop. His music-hall cluster, on the other

hand, may be so small and so poorly organised that he is constrained and nervous when he is taken into one of these places of entertainment. A man's cluster round the laws of his country is supposed to be big enough and sufficiently well organised to keep him straight in all his duties as a citizen. Every time a man's law cluster does not correspond to the law of the land in which he is living, there is a danger of conflict and disaster. What is true about this big and important cluster is equally true of the tiniest cluster, say that dealing with the relations between Henry VIII and Christopher Columbus. A defect in the first cluster may result in prison; weakness in the second will probably involve no worse result than a rebuke from a teacher, or a bad mark in an examination, or a trifling social humiliation.

While error inevitably results from any discrepancy between the clusters and things as they are in the outer world, it may also arise through complications brought about by the interactions of the clusters within the mind itself. Each cluster may correspond accurately enough to the outer world from which it was first compounded, and yet may prove a nest of error because of confusion arising from the interaction of the elements that make it up. We must not lose sight of the fact that each cluster is made up of individual concepts, and that those concepts are not confined to that particular cluster, but form potential parts of many different clusters. The same concept may play a minor rôle in one cluster and a major rôle in another, and its behaviour at any moment will depend on the cluster

that claims it. There is, accordingly, wide opportunities for errors slipping in because of confusion among the different clusters in which each concept is at home. Unless special arrangements are made beforehand, one cannot be certain which cluster will succeed in capturing a given concept suggested at a particular moment. Utter the word *Jack*, for example, before a heterogeneous group of people, and it will call up a great variety of clusters, differing from one another according to the experience of the various members of the group, and to the circumstances under which the experiment is made. It may recall simply a person of that name, but among the possible concepts it may suggest are a sailor, a court card, a sort of rabbit, or a kind of ass, persons connected with giants or beanstalks, or even with a female called Jill, an instrument for raising heavy weights, or another for roasting meat, or for removing cumbrous boots, a kind of fish, or a biggish knife, a sort of roof, a white ball used in the game of bowls. But obviously a great deal depends on the circumstances under which the word is introduced. If the word occurred in the course of a lecture on Modern French Literature, none of the foregoing meanings would have any place; the only cluster that will meet the situation is to be found in the novel *Jack* by Alphonse Daudet. In such a case the word can have only one meaning. To be sure, if the book is mentioned for the first time it may be that the student has no knowledge of it, but he has no temptation to apply any of the other meanings of *Jack*, and the context of the lecture must be such that the word can be uttered only to have its mean-

ing immediately explained. If, for any reason, the student attaches any other meaning to *Jack* in such a connection he is in error, and deserves censure, unless he can suggest some other plausible connection between this word and modern French literature.

It is only putting the same matter in a different way to say that the teacher in presenting matter to his class must always take account of the background against which the pupil is likely to project it. Each lesson has its own background, its own atmosphere. The word *Rome*, for example, produces one effect in a geography lesson, another in a history lesson, and still a third in a religious lesson. Some of the older-fashioned methods of teaching sinned grievously here. Each subject was kept severely within its own borders, and had no dealings with other subjects. History was history, and geography was geography, and neither acknowledged the existence of the other. The nickname applied to this unwholesome plan was "the water-tight compartment system." It is recorded that the word *Rome* occurred in the New Testament lesson, and none of the pupils could explain to the inspector what it meant. He mischievously threw in the innocent remark, "It's geography," and the dumb class broke into fluent explanation. They had not realised that the same concept could belong to several different clusters. Naturally the pupils would not put it that way. It is the explanation of their difficulty all the same.

At a later stage we shall have more to do with the backgrounds against which ideas can be presented. In the meantime we have to look into the way in

which concepts react on one another within the consciousness. The mode in which clusters are formed is co-presentation of concepts in consciousness. Every time concepts meet in consciousness they strengthen the bonds that bind them together, and every time a concept comes back into consciousness it has a tendency to recall with it some other concept with which it has made connection in a previous meeting. Since a concept cannot recall all the other concepts with which it has had dealings in consciousness, it must make a selection among them, and it is evident that the stronger clusters will have the advantage in any case where competition arises. The concept of *Jack* we have seen has made friends with concepts gathered round the concept of the game of bowls, and also with those associated with the game of bridge. But if in general conversation the concept of *Jack* is suggested to a bridge-player who has no interest in bowls there is little chance of *Jack* finding a place in the bowls cluster. On the other hand, if a person is talking to a bridge-player describing a game of bowls, and speaks of the exact position of the *Jack* on the bowling green at a particular point in the game, there is little chance of the court card taking the place of the white ball. All this is encouraging to the teacher, who is thus seen to hold the position of being able to determine beforehand which cluster shall claim each concept he presents.

This naturally raises the problem of how concepts find their way back into the consciousness after they have won an introduction into it. There are two modes of recall of concepts: *mediate* and *immediate*.

When we utter the word *Jack* we call up a concept in the mind by using the word as a medium. In the same way, by making a sign with the hand or by whistling an air, we may call up certain concepts in the consciousness of another. This is mediate recall, and is naturally preferred by the teacher to the other sort, in which concepts seem to come up into the mind of their own initiative. Now we can never warn ourselves too often that though concepts may be fairly described as forces, they are never self-created forces. They have no power of their own; whatever power they possess comes from the mind in which they originate. Their power is a reflected one. But though it comes in the first instance from the mind, it acquires a factitious appearance of independence. Frequently concepts seem to have the power of thrusting themselves into the consciousness in spite of us. We do not realise at the moment that this power has been acquired by our way of dealing with these notions in the past. It is in connection with things that we do not like that we most frequently notice this apparently tyrannical power of certain concepts. We do not at all object to the dictatorial way in which certain concepts present themselves when we happen to need them. Our whole organism of clusters is so arranged that certain concepts come up just at the moment when we need them. The multiplication table has been so brought to heel that it supplies arithmetical material just when we want it. We do not complain that we cannot think of seven times eight without the concept fifty-six coming into our consciousness, quite independently of our desires in the

matter. But whether the concept is a useful one as in remembering historical facts, or an evil one, as in the case of our being tempted to do something wrong, the force is the same, and the form of recall is immediate. The new concept seems to thrust itself into our experience without any invitation, and without any help from the mind concerned. In the last resort we can take away, to some extent at least, the power of a concept to thrust itself into the consciousness when it is not wanted. But the process of weakening the power of a concept is a slow one, and involves a long course of strengthening the presentative activity of other concepts. We cannot directly diminish the presentative activity of a concept, but we can diminish its presentative activity relatively to other concepts. In plain words, we can diminish the presentative activity of one concept only by increasing the presentative activity of rival concepts.

In any case, it will be seen that in dealing with the recall of concepts at any given moment, the distinction between mediate and immediate recall is valid and important. Certain concepts may come back to the consciousness at any moment on what appears to be their own initiative (immediate recall), while other concepts may be brought back by the use of some such medium as words, signs, sense-impressions. The teacher can use both forms of recall, but mediate recall he can use at short range for current needs, while immediate he can only use at long range, and look for its results in the more or less remote future.

Whatever share the teacher may have in modify-

ing their application, it is plain that the two forms of recall are at work all the time in forming new clusters and in elaborating old ones. The stimuli provided by the outer world are steadily building up clusters of concepts so arranged as to correspond to what goes on in the outer world. Elements that are permanently connected with one another in the outer world cause the formation of corresponding clusters of concepts. Even if the teacher did not interfere at all, and the pupil received no formal education, the clusters would be formed in this way all the same. But since the teacher must take a hand in the process if he is to carry on his function, it is obviously of interest and importance to him to consider the way in which concepts react upon one another in the process of cluster formation—in other words, in the building up of mental-content. He begins by wanting to know how concepts react upon one another when they meet in consciousness.

For our purpose we may range concepts into three groups according to their behaviour in cluster-building: *similar*, *disparate*, and *contrary*. The term *similar* may be restricted to what are practically the same concepts as they recur at different times. The scent of Eau-de-Cologne is the same to-day as it was yesterday, and as it will be ten years hence—allowance being made for the possibility of change in the sense organs of the person concerned. The reaction of similar concepts is one of *fusion*. Each time the concept is repeated in the consciousness its effect fuses with those that have preceded it. The result is that the concept strengthens itself. We find it more easy to recall

the scent of Eau-de-Cologne than that of Jockey Club, because we have not experienced the second scent so frequently as the first. Naturally, if our experience of scents has been in the opposite direction, our freedom in dealing with Jockey Club would be greater than with Eau-de-Cologne.

Disparate concepts have no resemblance to one another, and when they meet in the mind they cannot fuse, but merely group themselves together in a cluster determined by time and place. There is no connection whatever between Abraham Lincoln and, say, a big drum. Yet if we talk about those two concepts we shall establish a more or less justifiable connection between the two. Suppose some ingenious person set out to establish a real connection between the two, he might establish a sort of negative relation by pointing out that Lincoln was not an advertiser, and did not beat the big drum. In such a case, an artificial correlation might be established. But in ordinary life there is a steady building up of ideas into clusters without there being any resemblance among the elements that make them up. A *door* and *hinges* have no resemblance to one another, and yet they form a very natural combination. This process of grouping concepts together because of their time, space, causal or other connection is called *complication*, and the statement may be made that disparate concepts, when they meet in the consciousness, complicate or form a complex.

The third group of concepts are the most interesting of all. They involve a certain degree of resemblance and a certain degree of difference. *Contrary*

concepts resemble one another in so far as they belong to the same class, but differ within that class. The colours of the rainbow and the notes of the musical scale are examples of contrary concepts. Now when such concepts meet in the consciousness they do not fuse like similar concepts, nor complicate like disparate concepts. They do not go together at all. They oppose one another, they fight, they try to thrust each other out of consciousness altogether. In technical terms, they arrest one another, or inhibit one another. We can think of a lady dressed in a brilliant scarlet coat and a bright emerald-green skirt, but that is not realising scarlet and green, but merely a rather gaudily-dressed person. If we try to realise green and scarlet at the same moment we find that we cannot do it. The more vivid the scarlet becomes, the dimmer becomes the green; and when the scarlet is perfectly produced in the consciousness, the green has disappeared altogether. The same thing applies to airs in music. If a person tries to realise at the same time "The Girl I left behind Me" and "Tom Bowling," he will find that the thing cannot be done. The moment he has got "Tom Bowling" clearly realised in his consciousness, he finds he really has left the girl behind him; and when the experimenter brings the girl definitely into the centre of the limelight, Tom has certainly "gone aloft."

It is no relevant criticism to say that a man you know can play on the piano "Old Hundred" with one hand and "God Save the King" with the other. In such a case the man is realising neither the one

air nor the other. He is playing automatically on the paid-up capital of previous experience.

In the building up of the inner world these three processes lead to different effects. By fusion the elements are strengthened and vivified. The concepts are intensified, and make a stronger appeal as definite material out of which the inner world is compounded. Complication gives richness to the cluster. A matter may be clearly understood, and yet present rather a bleak and unattractive appearance. By a process of complication, a new whole may be worked up that not only satisfies the understanding, but gives æsthetic reactions that are both pleasant and profitable. It is the function of arrest to produce clearness by cutting off all unnecessary and confusing elements, and by eliminating all elements of contradiction.

These processes continue all the time; the inner world goes on ceaselessly growing, now under the teacher's guidance and now independently. When the teacher takes a hand, his work is usually said to be *instruction*—a term that accurately describes his work as a builder of the inner world of his pupils. Instruction must be distinguished from mere information-giving. It is an important part of a teacher's work to communicate knowledge, but it is not the only function, even on the teaching side, to say nothing of his important responsibilities on the educational. Even in instruction the communication of knowledge is only one aspect of the whole process; the arrangement of mental-content is another. To use a military comparison, the communicating of new ideas corresponds to recruiting,

while the organisation of the ideas already present in the pupil's mind may be said to correspond to drilling. In its full sense, instruction must be held to include not only the communication of fresh ideas but the organisation of the whole mental-content of the pupil. Many teachers seem to think that the communication of new ideas is the be all and end all of teaching; but it often happens that the organisation of ideas already within the mental-content of the pupil is at least as important as the imparting of new ideas. A whole lesson may sometimes be given profitably without the communication of a single new idea, though of course the new organisation of old ideas results in combinations that are really new concepts. The result of efficient teaching is an organised mental-content, in which each idea is put into its proper place, and the whole forms a unity in which all the elements not only correspond in their correlation to the outer world, but are consistent with each other.

The process of building the inner world may be described as absorbing the outer world, and at the same time being absorbed by it. Naturally any hitch in this double absorption produces a discrepancy between the two worlds, with the result that there is contradiction and consequent friction in the inner world. The removal of such disturbances from the minds of his pupils forms one of the main aims of the teacher. Some help in this clearing up may be had from a study of the laws of thought as thought; but not much. They are too abstract to give practical guidance, and all the help they can give may be had from a plain non-technical principle

that gathers up their essence under the straightforward name of the Law of Internal Harmony. All that it demands is that there must be peace among the concepts that form the mental-content at any particular moment. There must be no contradictions among the concepts, they must be all consistent with each other. The building of the inner world must be so conducted that discordant elements are not introduced. As soon as contradiction appears there must be an immediate reconciliation. At first sight this would seem to be a demand that the inner world should be absolutely free of contradictory elements. Yet we know that hidden contradictions are continually making themselves manifest in the course of our ordinary living and thinking. In the actual process of inner-world building it is usually possible to avoid the introduction of elements that are contradictory to elements that already form part of the inner world. But very often new elements are added without any reference to certain elements that are contradictory, but that are at the time in the unconscious. Thus there arises, whether we will or no, a fair number of contradictory elements that live together quite comfortably in the mind without any friction, for the excellent reason that they are never co-presented in consciousness. As soon as they are brought together at the same moment in consciousness uneasiness arises, the inner harmony is disturbed, and some means must be discovered of restoring peace. In the actual process of building up the inner world the teacher can do a good deal to help his pupils from admitting contradictory elements. Both in

the actual instruction of the school-room and in the ordinary living carried on outside the teacher's direct influence, the pupils are liable to let contradictory elements slip into their inner world. It is an important part of the teacher's work to take all possible precautions against this danger. He can so regulate his presentation as to reduce to a minimum the chances of the introduction of conflicting elements during the actual class-work, and by skilfully guiding the pupils' mode of learning and thinking to make them alert to detect discrepancies between what is presented to the mind, and what the mind already contains.

But when the best has been done to prevent the introduction of contradictory elements, the organised mental-content of us all will be found to include many contradictions that remain undetected till accident or the teacher's deliberate methods lay them bare. Many of us pass right through life carrying genuine contradictions in our inner world, but since they are never brought into actual juxtaposition these discordant elements remain in peace. There is no disturbance of the internal harmony, because the latent contradiction is not brought to light. As soon as a contradiction is exposed, the mind can have no peace till the two opposing concepts are reconciled to one another. The teacher asked her class what a blue-bottle buzzes with. The answer, "With its mouth," brought out the reproof, "Ah, I just thought you would say that; because you buzz with your mouth you think the blue-bottle must buzz with his." The children, having their familiar idea smashed, were

disturbed, and did not reach internal harmony till the teacher explained that the creature buzzed with its wings. If some time afterwards the teacher chanced to see a blue-bottle that had the misfortune to have its wings burnt off, and she found it buzzing more furiously than before, her mental equilibrium would be disturbed, for here is a plain contradiction to what she had believed to be true. In the case that actually occurred, the teacher thought she had been wrong while the children were right. She thought that the creature buzzed with its mouth after all. Still this inward confession of error did not bring internal harmony. This was attained only when at a later stage, after inquiry from a biological authority, she learned of the existence of the curious organ on the creature's abdomen, placed there evidently for the very purpose of buzzing. She never learned *why* the blue-bottle buzzes, and yet the internal harmony remained undisturbed. Ignorance does not have the same troublesome effect that contradiction has. We are content to remain ignorant of a great many things. We may want to know them, and occasions may arise when lack of knowledge causes great uneasiness; but in *every* case of contradiction there is uneasiness. Ignorance is, after all, a negative matter; contradiction is positive.

The process by which contradictory ideas are brought face to face may be called *Confrontation*. It forms an essential part of what is called the Socratic method in which people are led by teachers or others to discover their own errors, and by and by correct them. The pupil at the beginning

answers confidently any question the teacher cares to ask, but afterwards the answers bring out points that are not in harmony with facts within the experience of the pupils, and thus contradictions are laid bare. The teacher asks for example: "What is a lie?" and the pupil promptly replies, "What is not true." The teacher mentions the case of Columbus, who thought he had discovered India by a new route, and asks the children if they would call it a lie when he reported accordingly. The pupil's first answer is confronted with a situation that is inconsistent with it. He accordingly tries again: "Telling what is not true, and knowing it is not true." The teacher confronts the pupil with the case of the novelist who tells what is not true, and knows quite well that it is not true. The pupil tries again, and adds the condition, "Lying includes the idea of trying to make people believe that the lie is the truth." Again the confrontation brings up the novelist who does his best to make his stories appear true. In desperation the pupil introduces the condition that the lie is intended to benefit the liar. This time the confrontation introduces Sir Walter Scott, and the great sums he made by telling plausible tales. At this stage the pupil seems to lose hope of restoring internal harmony. His mind is ill at ease. So the teacher suggests a case. If a boy ran round a field in eight minutes and came back and said he did it in seven and a half, "Was that a lie?" This time there is eager assent. There is not the slightest hesitation in labelling the seven and a half as a lie. From this comes the satisfying definition of telling what you know to be untrue,

for the purpose of getting an unfair advantage. Internal harmony is restored to the boys, but to the thoughtful teacher other disturbing elements emerge, and peace can be obtained in his mind only when all the problems of white, grey, and black lies have been solved to his satisfaction.

It has to be noted here that what is necessary to restore internal harmony is not necessarily the truth, but only such a rearrangement of the ideas as shall enable them to live in peace with each other. Asked the rather unfair question, "Why do water pipes burst during the thaw and not during the frost?" an ingenious boy explained that when the thaw came pieces of ice fell down the pipes very rapidly and bumped very hard at the corners, so that by and by they knocked a hole in the pipe, and the water came out. Confronted with the fact that pipes did not burst only at corners, the boy tried again, and suggested that sometimes two bits of ice got jammed together, and would not let the other bits fall down, so more and more bits came, and by and by the pressure was so great that the pipe burst. With this the boy was perfectly satisfied, and would have gone away with restored internal harmony, even if the teacher had not given him the true explanation, that the pipe bursts during the frost, though the leak is not disclosed till the water can flow freely again.

This process of confrontation is in daily use by skilful teachers, and is one of the chief means of exposing error in order to correct it. We shall have a good deal to say about its application in the chapters that follow. But in the meantime we have

to examine the conditions under which contradictory ideas can exist in such comfort in the inner world that we have to make special provision for exposing their antagonism. When contradictory ideas are in the consciousness together, it is difficult to prevent them from clashing. In other words, when contradictory ideas are co-presented in consciousness they are nearly always detected as contradictory. No doubt, occasionally prejudice and self-interest so blind us to the facts of the case that even glaring contradictions escape discovery. But the admitted tendency to neglect unpleasant facts manifests itself more usually in an unwillingness to allow the awkward ideas to get into the consciousness at all than in neglecting the contradiction once it has been exposed to the light of consciousness. Honest clergymen spend a good deal of time in the pulpit in co-presenting in consciousness certain ideas that are commonly kept carefully in different parts of the experience of the members of their congregations. When a man says, "Business is business," he really means that he keeps his business clusters quite separate from his religious clusters. On the other hand, the clergyman deliberately brings face to face Monday morality with Sunday morality, and thus sets up a disturbance that causes a certain amount of moral and intellectual activity before internal harmony can be again restored.

Accordingly it is natural to expect that the unconscious is the realm in which contradictions flourish. It is worth our while, therefore, to take a look into what goes on below the threshold of consciousness, and see whether the concepts behave

differently there from what they do above. Everything seems to point to the conclusion that they behave below the threshold pretty much as they behave above. Within what may be called the dome of consciousness the concepts have various degrees of activity at a given moment. Some of them are vigorous and flourishing, just round about the apex; others are only half-way up the dome, but are fairly vigorous; while others are keeping themselves within the dome at all only with difficulty, and are likely to drop below the threshold at any moment. There is no reason to suppose that immediately a concept drops below the threshold it will at once take its place on absolutely equal terms with the concepts it finds there. It is here that logic is likely to play pranks with us and lead us into error. It maintains with justice that a concept must be either in consciousness or not. To this we cannot but agree. It does not follow, however, that this clean-cut distinction reduces all the ideas below the threshold to the same level of power. Psychologists of the unconscious recognise that below the threshold there are various regions in which the concepts disport themselves in different ways. It is not necessary to accept the departmental system by which the unconscious is mapped out into districts: the pre-conscious, the sub-conscious, the fore-conscious. It is enough that we realise that below the threshold the concepts, as we have already pointed out, behave in pretty much the same way as they do in the consciousness. The presentative activity of a concept may be insufficient to enable it to force its way into con-

sciousness, and yet may be great enough for it to exercise a certain influence on concepts with which it has connections, even though those other concepts can fight their way into consciousness while it must remain below the threshold. Further, it has to be noted that concepts may influence each other while they are all under the threshold, so that in this way a powerful combination of concepts in the unconscious may exercise a determining influence over the interactions of concepts that are in the consciousness.

But when the ordinary psycho-analysts begin to talk about what goes on in the unconscious, they rather frighten us. These nether shades, it appears, are about as bad as the imagination can conceive. That the heart "is deceitful above all things and desperately wicked," seems to many too severe a description of the ordinary workings of human consciousness, but when the psycho-analysts get going below the threshold of consciousness we are tempted to think that the Biblical statement is hardly strong enough. Fortunately, we do not need to follow the psycho-analyst into his den. We are not here specially concerned with the moral aspect. It is enough for us to know that the psycho-analysts admit, and indeed proclaim, that mental process of some sort goes on under the threshold. Following the lead of Herbart, who, after all, anticipated Freud, we find it possible to assume that there is activity going on beneath the threshold. Concepts that fall below the line do not go out like the electric light when we press the button. They do not retain sufficient energy to keep their place

within the consciousness, but they carry into the nether region sufficient energy to enable them to exercise a certain influence on the concepts that remain in the consciousness. It may not therefore be unfair to picture the concepts that have just gone below consciousness as exercising a definite influence on concepts that have retained their place in consciousness.

Indeed, may it not be permitted to apply to concepts the same view that is held with regard to certain physical phenomena. In the case of light, we know that above the red rays there are still longer wave-lengths, though the human eye has not the apparatus necessary to include them as colour, and that below the violet rays there are again wave-lengths this time too small to come within the human compass for actual seeing. So we may assume—as a mere expository device and without prejudice to our views of the relation between nerve-matter and consciousness—that a certain minimum amount of some sort of energy is essential before a concept can emerge into consciousness, but that just before this amount of energy had been developed the concept was immediately below the threshold, and therefore at a different stage from that at the moment before the development of this energy began. So when a concept has been in the consciousness and has just dropped below the threshold, it is in a different state from that it will be in after the lapse of time has drained it of all its energy for the time being. Our hypothesis for expository purposes, and with no pretence of scientific accuracy, is that all ideas,

whether in consciousness or not at any given moment, may be divided into those that have a certain amount of nervous stimulation behind them and those that have none. Of those that have any nervous energy behind them, some have enough to rise above the threshold, the rest have not. Those above the threshold rank in the order of the amount of energy behind them. The same applies to those under the threshold. On this hypothesis the same sort of interaction is going on below the threshold as above, so that activities going on below the threshold may have a definite effect upon what is going on above.

Thus concepts that have dropped below the threshold may still exercise an influence on the region they have just left, while concepts that are not yet within the consciousness, but are on their way there, may exercise an influence before they actually appear above the threshold. When we are writing an essay or discussing a subject, we have in the consciousness a certain number of concepts relevant to that subject. As we proceed, certain of these concepts pass below the threshold, and their place is taken by others. But the newcomers do not always, or indeed usually, burst upon the horizon without notice. Sometimes they do, occasionally with staggering effect, but as a rule they not only come gradually, but they send on notice before. When we are working out a problem we not infrequently have this experience. A particular line of argument seems attractive to us, the facts in support of it are at hand, and yet we have a vague suspicion that there is something wrong with the

proof we are offering ourselves. By and by up from the unconsciousness comes a fact that shows that our argument leads to error. This fact was on its way for quite a while, and though it did not make its official appearance at the beginning of the discussion, it had sent on its warning before, and thus exerted a distinct influence on the thinking of the person concerned.

We may perhaps have to go farther, and suggest that concepts that have neither been in consciousness recently, nor are on the present occasion to succeed in appearing there, may still exercise an influence on what goes on within consciousness. A concept may have acquired a certain amount of energy, and yet not enough to secure its rise above the threshold, and in the end not make an entry into consciousness at that time, and accordingly fall back into the great mass of ideas that show no appreciable presentative activity. Still this concept in its abortive effort to get into consciousness may have developed enough energy to exercise a definite influence on the concepts actually within consciousness.

Some at least of the mysterious warnings and intimations attributed to supernatural agents no doubt owe their origin to the workings of those concepts in the unconscious that exercise an influence on those above the threshold. We have to discriminate here between the ideational plane and the affective. A general feeling of discomfort may arise from the unconscious without our being able to account for it in terms of ideas. No doubt we are sometimes uneasy from purely physiological causes.

Those people who give attention to the interpretation of dreams distinguish very definitely between the contribution of the stomach and the contribution of the brain. Scoffers light-heartedly blame the nightmare entirely on the lobster supper. The new dream-interpreters acknowledge the share the lobster has in the process, but limit that share to the causing of the dream at all. But once the dream-state has been established, they say, then the brain gets its hand in, and ideas come to their own. We are not in the meantime concerned with the quarrels of dream-interpreters; our gain out of the investigations on which they base their arguments is the acknowledgment that there are ideational processes going on below the threshold of consciousness that have a specific effect upon what is going on above the threshold.

Without going all the way with the psychoanalysts we may admit that their investigations have at least established the existence of certain inhibitions rising from forces at work in the unconscious. We have seen this exemplified to some extent in the writing of an essay, or the working out of a problem, but in a more concrete form it has a recognised place in ordinary life. People often have this experience. They propose to act in a certain way; everything seems in favour of the line of action they propose to adopt; yet somehow or other they are disinclined to proceed. Something holds them back; they can find no satisfactory reason why they should not act in the way they proposed, but in a vague unideational way their action is opposed. They are being what the psychologists

call *inhibited* in regard to that particular line of action.

Without doubt this feeling of inhibition is far from a new phenomenon in human experience. It is well known, and has given rise to a great deal of uneasiness to mankind. As in so many cases when we cannot explain an unseen force, people went out of their way to account for the trouble. They invented an invisible personality whose influence exercised this inhibiting power. As a rule this guiding personality was regarded as benevolent rather than malevolent. It was a sort of sweet little cherub that sat up aloft, and took care of the interests of the favoured individual to whose service he was allocated. Socrates used to speak of his *daimon*, the spirit that hovered around him, and was always at his elbow ready to bar whatever roads were likely to lead in the wrong direction. Socrates is far from solitary in his claim to have an attendant invisible sprite to guide him. Many well-known people, and many people who are not at all well known, have adopted this explanation, and believe in a half-humorous way that they have a guiding spirit that prevents them from going wrong. It is a characteristically human attitude this of explaining an otherwise inexplicable phenomenon by personification. The view, above suggested, of the functioning of concepts below the threshold of consciousness is not so picturesque a solution of the problem, but it should suffice.

When all is said, the explanation here offered is hardly less factitious than the *daimon* theory. For, at the best, the explanation of the activity of concepts

below the threshold is a piece of pure personification. We have hypostatized the ideas and concepts, and treated them as entities. We have warned each other of what we have done, so that no real damage need follow, and, as a matter of exposition, experience has proved that this figurative treatment of ideas and concepts is much more easily understood than a purely abstract treatment; while, if we adopt a somewhat mathematical method involving diagrams, we find ourselves dealing with only a more difficult form of hypostatization. Personification is easier than diagrammatization, and just as true to the facts.

The conclusion of the matter is, then, that we may regard each mind as an organism made up of ideas and concepts arranged according to certain laws, which laws themselves form a part of its own nature; the ideas and concepts not being entities but modes of activity in which the mind manifests itself. We have to note that the concepts represent these modes in actual existence or operation, while the ideas represent them as mere potentialities. As we have seen that G. F. Stout used to get round the tendency to hypostatize the so-called "mental faculties" by calling them "modes of being conscious," so we try to avoid blame by speaking of concepts as "modes in which the mind acts." It is not so much that we have concepts, as that we are concepts; they are the means we use to show the sort of persons we are. They are the connecting links between us and the outer world in which we have our being. This inner world which we have each of us built up is in the last resort we ourselves.

Each inner world is really a developed ego. One is inclined to call it a filled-out ego, for the figure of container and thing contained has a compelling influence in our thinking. It is easy to picture an empty ego coming into the world and gradually filling itself up with what it can gather from the objective world. But for the contempt of writers like Hutchison Stirling we might be tempted to leave it at that. But we must pay philosophers the compliment of making an effort to get a little nearer to an abstraction. Let us regard the ego, then, as having an existence but no substance. It comes into the world as a mere potentiality, supported, however, by a substantial partner, the body, which may serve to some extent as an indication in a vaguely proportional way of the rate of development of its intangible partner. Corresponding to the development and growth of the body there goes on an inner development, though here the idea of growth is probably out of place, albeit my old friend, Professor Sir William Mitchell, gives me some warrant for using both terms about the mind, since he calls his massive book, *Structure and Growth of the Mind*.

After saying all this, I may assume that it will be admitted that I realise the dangers of my proposed use of the term *mental-content* to represent the inner world of each individual. It emphasises the knowledge element, and at the same time suggests the skill element. In other words, it gives expression to both the static and the dynamic elements in experience, and permits of the use of a great number of metaphors that are very useful

for expository purposes, and need not lead to any misunderstandings, if all the above qualifications are taken to heart and kept in view.

The teacher's problem, then, is to take an important part—we have a professional temptation to regard our activities as making up nearly the whole—in the building up of the pupil's mental-content, with all that that implies in the way of character as well as knowledge. We cannot make a complete separation between the two, but we can emphasise one aspect or the other. For our present purpose we limit ourselves to the knowledge side, and regard the mental-content as the body of ideas resulting from the interaction between the inner and the outer worlds. Our special concern is with the mishaps that occur between the two worlds in the case of our pupils. The aim of the teacher is to set afoot such an interaction between the pupil mind and the outer world as shall result in the establishment of a smooth-working relation between the two, so that the pupil will behave intelligently in relation to the outer world. To this end the teacher has to consider his own mental-content as a reservoir whence to draw material to fill out the mental-content of the pupil. No doubt the pupil will get large supplies from the outer world at first hand, partly under the teacher's direction, and partly on independent lines. But whether he gets his material directly or at second hand, the pupil runs the risk of organising it in a wrong way. There is an ever-present danger of error, and the teacher must be always on the look out for signs of things going awry in the building up of the inner world. Naturally,

error can be detected by careful and intelligent observation, even though the pupil himself may be quite unaware of its existence. It is the teacher's business to make himself familiar with the symptoms of error, and with the best means of avoiding, discovering, and correcting error as regards the mental-content of his pupils. His first business accordingly is to get into touch with the mental-content of his pupils. The problem of communication among the various separate inner worlds that make up his class is the teacher's first concern in dealing with error.

CHAPTER V

THE BRIDGE BETWEEN THE WORLDS

WHILE the inner world of each of us is in direct communication with the outer world, the various inner worlds have no direct access to each other. Consciousnesses stand outside of each other. Each personality forms a little island of consciousness in a great sea of the unconscious. We are in touch with our neighbouring islands, but we can never actually visit them. As Whittier happily puts it, we are

Allied to all, yet none the less,
Prisoned in separate consciousness.

Consciousness is as impenetrable as matter. But while consciousnesses cannot interpenetrate, they can communicate with each other by a system of signals. It is true that this system is far from perfect, and leaves many opportunities for error. But on the whole we have more cause to be astonished at the efficiency of the system than to complain of its defects. All the same, the means of communication between minds supplies the vast bulk of the errors of the market place.

Naturally words form by far the most important means of communication between the islands of consciousness, but there are others. To be sure they are all based on some system of interpretation.

By an agreement, gradually evolved out of experience, a convention is reached by which certain signs convey more or less definite meanings. Language is the most highly perfected system of such signs, and a very accurate means of communicating ideas is thus placed at our disposal. Indeed, communication carried on at the conceptual level almost demands the use of words. It is true that intercourse may be carried on by means of a more picturesque process sometimes called symbolism. But we are never quite sure that the two separate consciousnesses are thinking along exactly the same lines. The following story is no doubt told in other universities, but this is the way in which it has come down from the ancient days of Aberdeen. From the continent of Europe came a famous Professor of Signs, and found his way to Aberdeen where he desired to be put into communication with the local professor of his subject. The King was anxious to oblige, but there was the awkward circumstance that the university possessed no Professor of Signs. Unwilling to acknowledge this shortcoming, the King commanded the professors to produce someone who had wit enough to carry off the situation. The most ingenious person available was not a professor at all but a one-eyed butcher, whose mother wit in most cases made up for his lack of learning. He was presented in all solemnity to his continental colleague, and after the interview the visiting professor proclaimed himself thoroughly satisfied with his compeer. "When I met him," he reported, "I held up my one finger to indicate that there was but one God.

He replied by holding up two to include the Son. I answered by holding up three to take in the Holy Spirit. His conclusion was to hold up his closed hand to signify the oneness in three—the Holy Trinity.” Far different was the butcher’s account. “When we met he held up one finger to gibe at my one eye. I held up two to show that my one was as good as his two. He then shoved up three to show that we had only three eyes between us. So I shook my fist in his face, and would have gone further, but they took me away.”

Mythical as this tale may be, it indicates how easily this mode of communication may lead astray. The ideographic symbols of the old Chinese, out of which the characters of later periods were evolved, supply many examples of the ease with which such symbols may be misunderstood. I have made many trials with intelligent classes of pupils, the problem being to discover what each individual symbol represented, and the percentage of error was remarkably high, though in almost every case, when the accepted Chinese rendering of the symbol was given, the pupils admitted that the connection between meaning and symbol was clear enough.¹ In cases of this kind there is a deliberate attempt to establish communication, and the symbols have a conventional as well as what may be called a natural connection with the things symbolised. But often a sort of unwitting connection is set up between certain elements through the process of association. Because two elements of our experience have

¹ For graphic examples see my *Exposition and Illustration*, p. 137 (Eng. edition), p. 139 (Amer. edition).

occurred frequently together, a connection is set up between them in the mind concerned, so that as soon as one of them appears in consciousness it tends to suggest the other. There may be no logical connection between the associated ideas, and yet their mere juxtaposition may bring about their introduction into consciousness in an apparently rational relationship. Talking of gravitation the teacher asked the pupils, who first discovered the law, and when the pupils balked he helpfully reminded them of what he called "the apple story, you know." But instead of Newton and the falling apple, the suggestion called up Adam and the Garden of Eden. The teacher's words recalled one picture instead of another. Had he been a little more explicit he could have made it impossible for the mistake to occur.

The fact is that in words we have the finest available instrument of communication between minds, and that by a proper manipulation of this instrument we can secure an almost errorless passage of ideas from one mind to another.

But language is often very carelessly used, and all sorts of errors are continually occurring in consequence. In a famous passage in his *Leviathan*, Thomas Hobbes indicates a fundamental tendency to error through the use of words, when he tells us that words are the counters of wise men but the money of fools. Thoughtful and intelligent men use words to represent ideas, while fools use them merely as sounds to which they attach no clear meaning. Words have no real value apart from ideas. Behind every word a wise man uses there

is an idea. It is true that this idea is not fully brought into consciousness every time the word is used. But it is there to be called upon, if desired. In business a solvent man does not need to draw money from the bank every time he has to make a payment. He contents himself with drawing a cheque, which represents cash. In the same way a word represents an idea. In a political discussion very complex terms are commonly used without the disputants bringing into clear consciousness all the implications. The meaning of such words as *church*, *state*, *representation*, *diplomacy*, *bi-metallism* is not fully realised as they are used: but of any one of them the intelligent speaker or writer could give a full explanation if challenged. But this is not true of all men. There are some who carry on fraudulent transactions in the word market, as others do in the money market. There are still others who carry on intellectual intercourse honestly enough, but without sufficient capital in the way of ideas. They are not always able to elaborate clearly and accurately the full meaning underlying the words they use: the result being a crop of errors. Living "on tick" is as dangerous in the world of intercourse as in the world of finance.

Among those who make up this class of insufficiently capitalised folk who carry on discourse are people of school age. This is a matter of necessity, and carries with it no moral stigma. These young people are on their way to the mastery of the medium with which they will afterwards have to work their way through life. Their present state of uncertainty in the use of their instruments is of the very essence

of the process of education. Compared with the mature educated person the pupil has fewer words at his command, and has not even those few so well in hand. In ordinary society those of the same social standing meet on more or less equal terms with regard to ordinary vocabulary and sentence-construction. But in school we have the permanent situation of a mature mind dealing with minds that are not mature: and this involves the interaction between a wide and a narrow vocabulary. It may even be maintained that the work of the school is mainly concerned with meeting this situation of disparity of verbal facilities. In fact we have seen that Mr H. G. Wells puts the promotion of intercourse at the very head of the functions of the school, and says that all its other activities are subordinate to this. The statement that a science is but a well-made language gives further support to the view that the mastery of the language instrument is of the first importance in the school curriculum. All this suggests that we have in the matter of words an enormous scope for error throughout the school period, and particularly at the lower grades.

For though words may not be desperately wicked they are certainly "deceitful above all things," and play the most amazing pranks alike on flippant pupil and austere teacher. All the same we do not sufficiently appreciate the amazingness of the process by which a disturbance of the atmosphere causes ideas to arise in the minds of those to whom we speak. Still, for our present purpose, the essential point is the ease with which words

may convey wrong meanings, especially to young people.

To begin with, pupils at the school age do not have a sufficient supply of words to meet the needs of their rapidly growing mental-content. Whether they will or no they have to live beyond their verbal means: though this form of extravagance is really the best kind of economy, since it is the only way in which the means can be extended. With regard to the exact number of words at the command of children at various ages, we are in a much better position than our predecessors. The tendency in the past has certainly been to underestimate the vocabulary of young people. It was once stated in an educational work that a child of five had a vocabulary of only some two hundred words. A Director of Education in Canada reading this at home with his daughter, who had just had her fifth birthday, playing round his feet, picked her up, and before he set her down had elicited from her no fewer than one thousand words. He probably could have got more, but the child—and the father—was tired as the result of the intelligently pleasant process by which he had extracted so many. The number was changed in the next edition of the book, and the incident marked one of the many occasions on which this underestimation fallacy received a correction. It used to be said that an illiterate peasant knew only some three or four hundred words. Apart from the vagueness of the terms, "Knowing words" and "Having a vocabulary of so many words," the process of estimating the numbers left a great deal to be desired.

The subject has been approached from a somewhat different angle of late, and, though the methods cannot yet be said to be rigidly scientific, they are sufficiently accurate to supply reliable data. The matter has been approached from the standpoint of mental testing. It has been found that there is a fairly high correlation between the child's intelligence and the extent of his vocabulary. Accordingly, it became desirable to discover the extent of the normal vocabulary at various ages, so as to establish a standard test on this basis. The following gives the results of one set of investigations, and though the use to be made of the tables is quite different from ours, the data are sufficiently reliable to be of value.

Age.	Number of Words in Vocabulary.			
Eight years	.	.	.	3600
Ten years	.	.	.	5400
Twelve years	.	.	.	7200
Fourteen years	.	.	.	9000
An average adult	.	.	.	11700
A superior „	.	.	.	13500 ¹

Independent investigations following other methods seem to demand a somewhat more extensive vocabulary for intelligent adults: 17,000 being suggested as a more likely number. Giving the teacher the benefit of this higher estimate, we have a striking illustration of the difference between his vocabulary and those of his pupils at various stages. In spite of his best endeavours, the teacher

¹ Lewis M. Terman, *The Measurement of Intelligence*, p. 226.

must be constantly using words that fall outside of the range of his pupils, thus causing a certain amount of haziness if not of actual error. This is inevitable, but has its compensations. Were it not for this more or less unwitting introduction of words beyond the pupil's vocabulary, that vocabulary would expand much less rapidly than it does. Certain new words the teacher deliberately introduces as part of the work in various subjects, but there is always a sort of no-man's-land between the recognised pupil-vocabulary and the recognised teacher-vocabulary. Within this region the pupil is continually picking up new words and using them with greater or less accuracy. Many errors no doubt follow, but the resulting enrichment more than counterbalances this crop of mistakes, which, after all, are being gradually eliminated by the very process that produced them, the process of actual intercourse.

A good many of the disputes about the content of the vocabularies of different groups of people at various ages have their origin in neglect of the distinction among the different kinds of vocabulary in the case of the individual. For the words at our disposal are so arranged as to fall into different groups according to our use of them. It sounds rather wooden to say that we have all three vocabularies, a speaking, a writing, and a reading vocabulary. Obviously we, each of us, have a certain maximum number of words at our disposal, and it seems as silly to have a separate pen within which to gather each group as it was in the anecdote that tells how the absent-minded scientist built a

kennel for his dog and thoughtfully put in two doors, a big one for the dog and a little one for the pups. But a better case can be made out for the classification of the vocabularies. For the distinction of the three vocabularies is based upon the *use* made of the words. No doubt the reading-vocabulary is the biggest and must include all the words that belong to the other two. But we do not use in writing or speaking all the words of our reading-vocabulary. Many words we understand in reading we would never think of using in speaking. In the same way, a great many words we use freely in speech we would never dream of using in writing. A large number of the words we regularly use in our business letters we would shudder to meet in our daily conversation.

Certain misunderstandings arise from a neglect of recognising the different kinds of vocabularies. It is commonly complained that our Public School boys have a very limited vocabulary. Some critics in fact accuse them of being almost inarticulate. Indeed these critics go the length, on occasion, of saying that after the schoolboy has said "rippin'" in praise and "rotten" in disgust, he has no more to say. The mistake arises from confounding the boy's written with his speaking vocabulary. Who ever caught a schoolboy in the quadrangle or the playing field using the word "albeit" or "fain"? Yet he probably knows the meaning of both, and can use them in his essays, or at any rate in his translations from Vergil or Horace.

It is clear that a common source of error is this confusion. If a boy carries over from his speaking-

vocabulary to his writing-vocabulary the meaning of a certain word, it is easy to see how misunderstanding may occur. The boy who in a composition in a London elementary school reported that Pharaoh's daughter whipped Moses till she was tired, explained his remarkable statement by a reference to the text where it is mentioned that she could no longer *hide* him. Only familiarity with *The Elegy in a Country Churchyard* could help the reader to an intelligent rendering of the words in a schoolboy's essay, "Full many a gem of purest racerine." Here the boy interpreted the spoken words of his teacher along the lines of his own reading-vocabulary, which was unfortunately adulterated by a very liberal allowance of advertisements. He was so accustomed to gasoline, listerine, not to speak of margarine, that the error was not at all unnatural.

One of the most powerful causes of error in connection with language is also one of the most potent influences for good in education. This is the tendency inherent in all of us to introduce order among our ideas; to build them up into a reasonable whole; to give them a meaning. G. F. Stout began the application of the terms *noetic* and *anoetic* to our experience. Whenever the elements of our experience can be arranged in an intelligible way we may be said to have noetic experience, whereas when the elements are presented disparately and make up not an intelligible whole but a confused medley, "a thing of shreds and patches," we are dealing with the anoetic. Henry Sturt in his *Principles of Understanding* carries the matter

further, and develops a doctrine of *noesis* in which the essential point is that there must be a unifying underlying principle that introduces order and meaning among the various elements that make up intelligible experience at any moment. The idea that underlies terms like *pattern*, *tune*, *system*, *scheme*, *plan*, is of the essence of *noesis*. The mind is continually on the look out for some unifying principle under which the disparate elements of ordinary experience may be reduced to order, and rendered intelligible.

One is tempted to call this active hunt for intelligibility by some such name as *noeticisation*. But the name is pedantic and repels, and were the matter of less importance one might be content to give up a definite term altogether, and merely refer to it by some periphrasis. But the process is so prominent in the formation of errors that it cannot be relegated to a mere side place. It stands in the very forefront, and calls for repeated and thorough treatment. In order that the name may not be a stumbling block let us make a special application of the term *rationalisation*, by which we are to understand what Stout or Sturt might prefer to call *noeticisation*: the process of introducing order and meaning into a mass of material that might otherwise have remained quite unintelligible.

It will be seen that rationalising has a close relation to the law of internal harmony. Whenever this harmony is destroyed, an effort must be made to restore it, and this means that we must begin to rationalise the material submitted. All this applies to our whole experience, but perhaps

nowhere is its working better exemplified than in the realm of words. Meaning is of the very essence of words, so that, if a group of words conveys no meaning to us, we are almost as much distressed as if two contradictory concepts are discovered to exist in the mind. A group of words or sentences that conveys no meaning to us is an offence not to be tolerated. We at once attack the material, and if we cannot read a meaning *in* the data, we set about reading a meaning *into* it. In other words, we rationalise the material. Here, as in other directions, the harmony that we restore to our inner world is not necessarily based upon absolute truth. The systematisation we finally adopt may not be the true one, and may be subject to future correction. But in so far as it meets *all* the conditions of our problem we can be satisfied. So long as *a* meaning can be attained, the mind is apt to rest content without inquiring too closely into how the harmony has been attained—but it is imperative that some sort of harmony should be reached.

Even in such simple matters as spelling, this rationalising tendency is manifested. Children often spell words according to what they regard as the fitness of things. The classes of the elementary schools of England are known as standards, and this word used to be frequently spelled by the less literate children as *standers*. The explanation is that in those old-fashioned days children in the same class were called out to the open space in front where they stood, with their toes to a chalk line on the floor, for instruction in such subjects as reading, spelling, geography. *Standard* conveyed no meaning

to these children, but *standing* did. Accordingly, they called the classes "standers," because the youngsters *stood* around the teacher. On one occasion a similar argument was used by a pupil in an elementary school to justify his spelling of the cock's nickname as *Chanticlear* instead of *Chanticleer*, the argument being that the teacher had said that the name was given because the cock's song was *clear* and that wasn't *cleer*. Here the French form of the word and the general irregularity of English spelling had to be introduced before the pupil was satisfied.

Rationalisation of the spelling of words is not uncommon even among grown people of little education. *Necessity* is not infrequently spelled *needcessity*, the reason being that a certain meaning is attached to the word by introducing the notion of *need* instead of the (to them) meaningless first syllable of the Latin form. Half-educated people sometimes read an unwarrantable sound into the word *delicious* by calling it *deluscious*. Almost certainly we have here a telescoping of the two words *delicious* and *luscious*. In a certain Bible lesson in a Scotch school the teacher quoting from the Bible told the children that the people "went to their cities," but in her Scots tongue spoke of "ceeties." From this the children inferred that the people went and sat down, the interpretation being based on the fact that "ceeties" sounds the same as "seaties," the latter term being the ordinary diminutive applied by the northern Scots pupils to their little seats. In another Bible lesson, in answer to the question, "Who was Cornelius?" came the

reply, "A street musician," and on being challenged the pupil justified himself by referring to the text, where sure enough the centurion was spoken of as "leader of the Italian band." Street bands were the only kind known to this youngster. It has passed into the hoary traditions of our profession that on one occasion a girl defined an average as "a thing hens lay eggs on," the explanation being that the girl had read in a book that a hen "lays on an average" a certain number of eggs in a year.

Advanced pupils are quite as apt to rationalise unhappily as are their juniors. When Cæsar's movements are described in the text as taking place *summa diligentia*, it is not altogether unreasonable for a boy to say that he went "on the top of a diligence." After all, a diligence was at one time a recognised mode of locomotion. Most howlers are clear exemplifications of rationalisations that have gone wrong. But rationalisation is sometimes so easy, so self-evident, that it can hardly be called rationalisation in the full sense of the term. A borderline case is supplied by the boy who defined a *gauntlet* as "A little thin person." Here the idea of *gaunt* meaning hungry-looking and therefore thin joined with the diminutive *let* to make a reasonable combination. There was probably just a little reasoning about the matter, and a coming to a definite conclusion on not altogether negligible premises, as in the case of the explanation, "*Chaplets* are small places of worship." But sometimes the conclusion is reached entirely on the observation zone, without any inference at all. For example, the word "diplomatic," when used in its technical

sense of a mode of expressing oneself in writing in a certain conventional way, is very often interpreted by the unwary reader in the usual sense of the word, that is, skilful and tactful treatment of a situation or person. By a similar confusion, few ordinary readers realise the precise meaning of the word *vacant* in Goldsmith's line,

And the loud laugh that speaks the vacant mind.

The majority of Shakespeare's readers believe that when Biron in *Love's Labour's Lost* speaks of meeting "in another and a better world," he refers to heaven. In all such cases the elements fit so easily into the first whole (cluster) that suggests itself, that there is no deliberate rationalisation required.

The trouble arises when the meaning is just a little obscure to the person addressed. This frequently takes place in the case of prosaic people reading poetry. To be sure, people of that kind have usually no desire to read poetry, so they are not often at fault. But sometimes poetry is thrust upon them, and they have to make the best of it. The exercise called *paraphrasing* has had its day, though it has not quite ceased to be, and in its day wrought grievous harm to non-poetical pupils. It certainly had some advantages. It at least provided matter about which to write. The pupils were no longer under the necessity of the young pupils whom Locke describes as going to the older boys and plaguing them by the petition, "Pray give me some sense," by which they meant something to write about in their themes. But if the paraphrasing exercise did help the pupils to pass from the ghastly position

of having to say something to the higher estate of having something to say, it took a heavy toll in the way of effort to understand what the original was all about. Those who set the passages to be thus treated were specially fond of verse in which the order of words was as tortuous as possible, and where the vocabulary was of the most erudite and "conceited" type. The whole exercise suffered from the fatal defect that it almost necessarily consisted in turning bits of excellent writing into bits of thoroughly commonplace writing. The wiser teachers, since circumstances compelled them to give some paraphrasing, took care to select the passages from the less Parnassian writers. Still wiser teachers took passages from dialect, which left the pupil the whole of his own standard language in which to express ideas originally set forth in dialect or indeed in slang.

But even in dealing with subject-matter that left full opportunity for good expression, there was plenty of room left for error. This is clearly illustrated in the facility with which error can creep into translations. Sometimes a boy will have carefully looked up every word in a passage he is called on to translate, and yet he can make no sense out of the passage as a whole. The same thing can occur in an attempt at paraphrasing, and when it does, the only thing left for the pupil is to rationalise in the best way he can, the mass of unintelligible material. Not infrequently the emotional tone, and the political and social prejudices of the writer, will do their part in derailing the young paraphraser from the path of truth. Tennyson's "With equal husbandry the

woman were the equal of the man," was twisted as follows into a feminist sentiment: "If man and wife had equal rights, they would be equal in all respects."

Sometimes the passage moves quite smoothly yet hides a nasty snag, as in the case of the passage from Milton about the "brook that flowed fast by the oracles of God," where the unsuspecting paraphraser rendered "fast" by "rapidly." This unsophisticated literalness is better than the blank lack of comprehension that used to mark some of the victims of this unwholesome paraphrasing. Being unable to make either head or tail of the passage they fell solidly back on the dictionary, gave equivalents wherever available, and let the sense look after itself. Faced with the following couplet from Scott,

But why stands Scotland idly now,
Dark Flodden, on thy airy brow?

an unintelligent pupil could make no sense of it, but, Jupiter Dictionarius aiding, produced the following: "However, wherefore does Scotland remain indolently upright at present on the atmospheric forehead of gloomy Flodden?"

He was disappointed at the coldness with which his effort was received. He could no more understand his rejection than could the girl who failed to satisfy the mistress with "maternal pigeon" as an equivalent for "motherly dove."

We are here beyond the range of rationalisation altogether: the new combination of words makes no sense at all. However untrue the rationalisation, it must make sense. Indeed, this is the first con-

dition laid down by the weary instructor. Teachers of languages in their own way emphasise the same point. With some degree of despairing optimism the language-master beseeches his pupils to realise that they can begin with one absolutely fixed principle in translation: "Take my word for it: the passage means something; if your translation means nothing, you may take it for granted that it is wrong." The duller pupils accept this doctrine and follow it to the extent of getting some meaning, leaving it to the gods to determine whether it is the true meaning.

Whatever the rationalisation, the result must be plausible. Without this it will not satisfy even the pupil, to say nothing of the master. But plausibility has its dangers, as is exemplified in the case of Thomson, whose work was so plausible that he did not know that he was rationalising at all. He presented to his master in school a piece of Latin prose that contained the remarkable phrase *Mithridatem largem*. The master knew that there is no adjective *largis* in that language, from which the accusative *largem* could come. But it took him quite a while to discover the source of this mysterious phrase. At the end he reflected that Thomson's parents were well-to-do (it was a day school), and could afford to give the boy a tutor. So the following dialogue took place:—

Master. You have a private tutor, haven't you, Thomson?

Thomson. Yes, sir.

M. And last night you went over your prose with him?

T. Eh? I suppose so. Er-eh, that is, yes, sir.

M. And, in fact, he dictated the version to you?

T. Yes, sir.

M. And he dictated to you *Mithridatem largem*?

T. Yes, sir. (*This time Thomson answers with some confidence : his tutor was a scholarly man, and the boy could rely upon the Latin dictated to him.*)

M. And you had not the sense to know that when he said *largem* he meant *large M*, or capital M?

This concluded the business. Thomson's facile rationalisation of the material supplied had proved his undoing. In this case, indeed, it might be claimed that it was the master who did the real rationalising.

In seeking to avoid the misunderstandings that are continually arising in the use of words, it is only natural that we should look to definition in search of help. We have found that we learn the meaning and use of a great many words by the simple process of using them. We learn to speak by speaking. By a more or less unwitting form of imitation we get into the way of knowing how to use and how to understand words. How few people can honestly say that they remember when they first learnt the meaning of the simpler monosyllables in the mother tongue. There are very few who can remember the time when they learnt the meaning of such words as *in*, *for*, *of*, *by*. Certainly people do not learn the meaning of these words by looking up the dictionary, and reading what it has to say about them. We just work our way into their meaning. No doubt at later stages in our education we turn to the dictionary and there get a sort of post-mortem acquaintance with meanings that we already had practically acquired. A friend of mine declares that he

remembers the very moment (it was in church) when he learned the meaning of the word *thus*. Up till then he had always regarded it as merely a slovenly way of spelling *this*, and the fact that *thus* almost never occurred outside the Bible confirmed him in his suspicion. His favourite reference was, "Thus saith the Lord." But on this Sunday he happened to notice the word at the beginning of several chapters used in a slightly different way in each case, and, by comparison of the different uses, and by direct inquiry from his father when they got home, he mastered this rather troublesome word.

It seems at first sight a satisfactory solution of the whole problem of misunderstandings through verbal confusion to refer continually to the dictionary. But it is hopeless to get our pupils to master the accurate definition of every word they use, and though application to the dictionary will remove certain detected obscurities, it will not discover misunderstandings that arise in the easy natural course of life. The dictionary will never, for example, call a person's attention to the fact that *permeate* is a trisyllable, and, if he knows the meaning of the word, this person may use it correctly all through his life without anyone caring enough about the matter to tell him that it is not a dissyllable. On the other hand, a person may live a long life using words intelligently that he could not by any possibility define. If a highly educated audience were suddenly called upon to give an accurate definition of the term *dog* on pain of death if they failed, there would be a terrible mortality in that

hall. Still, all those decent people know perfectly well how to behave themselves intelligently, if not always wisely, in relation to dogs.

Yet there is a certain value in definition by itself, though it has been grossly abused by schoolmasters in the past. It undoubtedly tends to clearness, if in no other way than in making us realise in what directions we are ignorant. We smile when the pedant Armado in *Love's Labour's Lost* addresses the page Moth in the quaint words: "Define, define, well-educated infant." But there is sense in the demand, and the boy's answer does clear up a certain ambiguity in the situation. Some of our older-fashioned teachers would not be disinclined to accept Armado's command as a professional motto, for in their daily round they are perpetually repeating it in less picturesque phraseology. It is their favourite method of preventing errors occurring, and of correcting them when they do occur. It is certainly useful for both purposes, but the wise teacher realises that he must not look for an exact definition in the logical sense. At the early stages any statement by the pupil that shows an appreciation of the meaning of the term has to be accepted. Indeed the form the definition normally takes is in itself an indication of the state of advancement of the pupil. At the lower stages it is a characteristic of mental process that objects are defined by the use to which they can be put. A knife "is something to cut with," a bank "is for putting money into," a table "is for taking your dinner at." It is only at the higher stages that the youngsters reach the point at which they can deal

with class-terms and differences. The logician's *Genus plus difference*, as in *Man is a rational animal*, demands a background that is far beyond the reach of the junior schoolboy. Yet from his first appearance at school this boy is able to deal intelligently with a vast array of things. All that the youngster can handle efficiently in his ordinary life makes up the outer world for him. It is true that his outer world is in a sense the same as that of his elders, but in another the outer world of the grown-ups differs materially from that of the young folks. This is recognised in a very practical way in the specially constructed furniture now to be found in rooms where the Montessori method is thoroughly applied. In ordinary life, and too often in ordinary schools, the little people are compelled to deal with man-sized tables and chairs, and their elders take it for granted that the same reaction takes place in the little heads as in their big ones. It requires a specially trained artist with a plastic imagination to paint pictures that give a true presentation of the outer world as it appears to thirty-four-inch-high humanity.

It is easy to see, therefore, how little ones make mistakes with regard to this outer world of theirs. They are making experiments all the time, and marking or discovering all manner of unexpected agreements and disagreements. As development proceeds, greater and greater stability is attained. More and more exceptions are reduced to obedience to rules, and teacher-vocabulary and pupil-vocabulary get into line. The bridge between the teacher-inner-world and the pupil-inner-world

becomes more stable, and the probability of error is sensibly reduced.

So far we have been dealing with the vocabulary as a matter of individual words. But we have seen that the concepts for which those words stand have a tendency to organise themselves into groups or clusters with the result that any individual word has a tendency to recall whole groups of ideas, the particular group called up being determined by the circumstances of the case. These combinations of ideas brought into consciousness by words or other symbols form what may be called a background against which the ideas current in the mind at the moment may be presented. Generally speaking, in communication between two persons, the same background is present in the consciousness of both. But occasionally it happens that each presents his ideas against a background different from that in the mind of the other, with an inevitable misunderstanding of each other's point of view. The situation is usually described as being one of cross purposes. This situation is frequently used in plays and novels for its dramatic effect. Keeping to a scholastic background I have had the following example supplied me by an American student, now happily married. It appears that when she got engaged to an instructor in a great university, it became necessary to report the fact to a formidable Aunt Julia, whose worldly characteristics were a rather inordinate love of success, and a certain social snobbishness. She had, however, many compensating virtues. As far as she can recollect, my student had this interview:

Niece. He is well connected, and is an instructor in so-and-so University.

Aunt J. Is he a professor?

N. (coldly, but sticking to her determination not to claim more for her fiancé than was his right). I told you he was an instructor.

A. J. And I asked if he is a professor.

N. Well, you see, Auntie, an instructor is a sort of professor.

A. J. (with asperity). Yes, I know that "sort of" professor. A man is either a professor or he is not. Evidently this one is not.

N. Not exactly, but he belongs to the professor class, and will become a professor by and by.

A. J. That old, old story "by and by." How can you trust yourself to such a dangerous type of procrastinator?

N. It's not his fault. You can't become a professor just when you like.

A. J. What's to hinder him? Now is the accepted time.

N. But you don't understand. You can't go to the President and say: I want to be a professor.

A. J. What has the President got to do with it? *Now* is the day of salvation.

N. Why, it is the President who makes the professors——

A. J. (interrupting). Is the President a clergyman?

N. Really, I don't know. But what has that got to do with it?

A. J. (slightly unbending). Is he a religious man? Perhaps he is, and that would make things better.

N. I don't know at all, and I don't see what you are driving at.

A. J. Well, if he is a religious man, and wants to lead your fiancé into the true path, things may turn out all right, but why does he not close with the opportunity at once, "whiles he is in the way with him"?

N. Do tell me what you are talking about, Auntie. You

can't be a professor till you get \$6000 a year, and the university hasn't that amount of money to spend just now.

A. J. (*shocked*). But salvation is free. What is to hinder him from professing to-day. He can become a professor "without money and without price."

N. (*at last enlightened*). Oh, Auntie, he is that kind of professor all right, and long ago. What I meant was that he had to begin as instructor in the university, before he could rise to a university professorship.

The background of religion is an unusual one against which to project the idea of professor, but it is seldom that the misunderstanding is kept up for so long. To tell the truth I had a good deal of difficulty in getting an example of cross purposes that would last long enough to meet my need. Most of those that occur in literature are cleared up with the rapidity that dramatic action demands. In school work the misunderstanding usually lies on the surface. There is no difficulty in identifying the background in the case of the pupil in an American High School who answered the teacher's question, "What is the President's Cabinet?" by the naïve, "Where he keeps his collars and ties." The teacher asked from a political background, the pupil answered from a domestic. Against a background of wrongs, Shakespeare makes Malcolm say in *Macbeth*,

What I can redress,
As I shall find the time to friend, I will.

But against a background of military disaster and a broken army the pupil in an American High School took this to mean that Malcolm was promising to give the army new uniforms. It was entirely his

own idea that introduced the colour element, for he represented the new uniforms as being red. Granted the essential difference in the meaning of *re-dressing*, the touch of colour was not in itself objectionable, though one would have rather expected the colour from an English pupil accustomed to the old English uniforms.

It is probable, however, that the following misconception could not have occurred in an English school. In describing the scene in *The Merchant of Venice* when the suitors make their choice, an American girl spoke of the "funereal effect." Only one familiar with the American use of the term *casket* as equivalent to *coffin* could understand the grim suggestion. But while a single word misunderstood may thus change the whole background, the general habit of mind and the ordinary line of greatest interest will often call up a background quite other than that in the teacher's mind. A trivial example is to be found in the case of a teacher who in speaking of a bow and arrow found that one of his girl pupils had projected the sounds against a background of dress, and contrived to make sense out of the words by introducing the idea of a slight ribbon that was "a bow and narrow."

So far we have been speaking of backgrounds of the most general character, backgrounds that are open to the whole world to choose from. But when we come to certain school subjects we have prescribed backgrounds that must be adopted under penalty of breaking down completely. All the conventions of mathematics, for instance, erect a series of rigid backgrounds against which all the

prescribed problems must be projected. Take, for example, the fixed convention that multiplication and division have precedence over addition and subtraction in a mixed group of numbers involving the four simple rules. Thus it is agreed that

$$8 + 2 \times 3 = 14.$$

But at certain stages many pupils neglect the convention, take addition as it comes, multiply the result by 3 and complacently give the result of the process as 30. Mathematical teachers might—and sometimes do—make out a list of conventions of this kind that seasoned dealers with the subject recognise and observe, while beginners at various stages are liable to be led seriously astray. Obviously in well-organised subjects the necessary conventions can be systematically taught, and the dangerous spots provided with the necessary warning notices.

The popular saying that a science is but a well-made language deserves working out in this connection. A great deal of the confusion that arises at the beginning stages of a science subject owe their origin to confusions arising from vagueness of the meaning attached to the technical terms used, and particularly in cases where—as at the beginning of geometry—there is a fair number of terms in common use, but applied in the science in a special sense. Young people often resent the pedantry of the technical language used in their science studies, so the careful teacher makes a point of giving exercises in the use of these terms, and of thus demonstrating the need for the definite

restriction of their meaning. To be sure, certain types of pupils gloat in the jaw-breaking technical terms, but this particular vice (terminological pedantry) soon passes away, while the accuracy remains.

In the more general matters that form part of the process of training youngsters to make themselves at home in their environment, there are very many snags for which the most careful teacher cannot be expected to be prepared. When a child expressed disappointment with the first group of coloured children he had ever seen, on the ground that they did not show all the varieties supplied by the rainbow, the teacher could not be expected to anticipate this demand for wholesale colour. Every teacher out of a full experience can produce a rich crop of errors that illustrate excellently this fallacy of the background, even though the cases are not at all amusing. The plan, familiar to teachers of junior English, of making the pupils produce sentences exhibiting a certain word in actual use, is probably one of the most effective ways of discovering and correcting errors, and in the majority of instances the cause of the error is an inappropriate background. When a pupil gives in, "The farmer dispelled the seed," he suggests a meaning that is wrong in his example, but is quite in place in the sentence "the sun dispelled the gloom." Sometimes the pupil's example is on the very verge of being correct, but cannot be accepted. "Scrambled eggs are *chaotic*" conveys a meaning to one who knows the real signification of the term, but people do not use it in just this way.

Sometimes a more or less technical term leads to confusion. The statement that the chief export from Chile is shoe-strings should have caused no surprise to the teacher who used a certain geography text-book in which Chile is spoken of as "the shoe-string country of South America." The girl who made the blunder could not be greatly blamed, for the comparison is rather strained. No doubt Chile is a long drawn-out country, but it is not nearly attenuated enough to suggest immediately the idea of a shoe-string. The appropriate background does not spring to the eye.

Sometimes an objectionable background rises when a passage suggests something that we are not willing to have in the minds of our pupils: the sort of thing that was in Ovid's mind when he wrote *quid melius nescierim*, or in the thoughts of Prometheus when he said, *Not to know this is better than to know*. An illustration is to be found in a confusion that was discovered in the minds of the girls in an American High School about the meaning of *The Lady of the Lake*. The teacher discovered that there was in the class an impression that the poem did not begin on a very high level, the sinister keynote being supplied by the apparently innocent opening line,

The stag at eve had drunk his fill.

Drinking one's fill at that time in America was apt to arouse a certain unwholesome context. But one would have thought that the well-established strictly non-alcoholic habits of the stag would have saved the situation. But unfortunately the stag

himself had become suspect in the minds of these girls, for it had got connected with various forms of entertainment restricted to men. So the idea of masculine potations got a grip of the girls' sensitive consciences, the degree of the drinking being indicated by the words "his fill." The lady in whose class the misunderstanding occurred saw nothing humorous in the incident, and was, indeed, greatly distressed.

But whether the result in any given case be humorous or depressing, the teacher must make up his mind to the certainty of having a steady supply of failures of meaning or significance to effect a safe passage from teacher-inner-world to pupil-inner-world, and he must be ready on the shortest notice to deal with the misunderstanding that inevitably arises. While we use language with great confidence that we shall be able to bridge the gulf between the different islands of consciousness in the great sea of the unconscious, we must not forget the warning that "Words, like nature, half reveal and half conceal the thought within."

CHAPTER VI

PROPHYLACTIC TREATMENT

THE old-fashioned doctors had the conservative attitude of waiting for patients to call on them for help. To-day the surgery and the consulting-room are still waiting for us when we feel the need of them. But our modern doctors take up a more energetic attitude towards disease. All the so-called preventive medicine comes for consideration here: but between the individual doctor who has a definite group of patients on whom he is always ready to attend when need arises, and the body of public-service doctors whose business it is to arrange our environment so as to prevent diseases arising, there is the enterprising doctor who keeps an observant eye on his patients even when they are not actively under his treatment, and suggests modes of living and dieting that will prevent the incidence of diseases to which these patients are susceptible, diseases which sooner or later will develop in the ordinary course unless treatment is applied that will ward off wholly or partially the attack of the incipient malady. Such treatment is commonly known as prophylactic. It is not always successful, but it often does a good deal to delay the onset of a disease and to modify the severity of its course.

It may be worth while to consider how far prophylactic treatment is available in school. Can our teaching be so arranged as not only to correct promptly all errors as they arise, but to prevent their rising at all? It must be sadly confessed that it is impossible to avoid altogether the emergence of errors. A certain proportion of errors may be calculated upon in every series of lessons, but this percentage is often higher than it should be, and may be reduced by taking proper precautions. It will be noted that any attempt in this direction is to approach the problem of the *Officina Hominum* from a new angle. We have already admitted that the officina ideal cannot be fully attained. It remains to be considered whether we can sensibly reduce the number of errors that accompany our teaching. The problem is really to reach a minimum coefficient of error in our teaching.

To begin with, the very introduction of this problem is apt to produce a slightly morbid attitude on the part of the teacher. We have a popular saying that takes many forms but always has a plain meaning, that may be expressed in the words: "He who seeks trouble finds it." So there may be a danger that the teacher who is always on the lookout for error will find it in abundance. In point of fact he certainly will; but this result, so far from being undesirable, is positively advantageous. The apparent increase in the number of errors is not a real increase in errors, but in the number of errors detected. The teacher on the outlook will find many more errors than would another who is not screwed up to the same pitch of interest in this

direction. To be sure, there is a certain danger of the deliberate error-hunter acquiring a somewhat unwholesome cast of mind, which may arouse a disturbing reaction in the whole relation between teacher and pupil. We have already seen that there is danger of an unwholesome atmosphere arising in school through excessive correction of errors. But at the present moment we are concerned with the prevention rather than the correction of errors, and in the process the teacher may quite well keep to himself the purpose he has in view, and so apply his methods that the pupil may not be in the least aware of what is being done for his benefit, and therefore run but small risk of being reduced to a morbid mental state.

Indeed, the very first principle the prophylactic teacher must accept is the need to understand what is going on in the mind of the pupil. We have already emphasised the need for the most complete knowledge possible of the mental content of the pupil. The more thoroughly this is known to the teacher, the less chance of his presenting matters in such a way as to lead to error. But in addition to mere awareness of the pupil's stock-in-trade in the matter of knowledge, the teacher must be in sympathy with his mental state. Among the qualities essential to success in the work of teaching, sympathy stands by common consent at the very top. Ask any group of intelligent trained teachers, and the answer will be almost unanimous that the most essential personal equipment of the teacher is sympathy. Naturally this quality gives the power of putting oneself in the place of one's pupils, which

enables the teacher to begin his lesson from the best possible strategic position.

We have seen already that every time a teacher is surprised at an error his pupils make he has to record a professional failure, and when this occurs the wise teacher will be very careful not to proclaim his surprise, though he will be quick to get at the bottom of the error so as to remove that surprise. When the pupil makes a mistake that the teacher rather expected, there will again be no demonstration. Some teachers like to remark knowingly that this erroneous answer was the very thing to be expected. In dealing with mistake-traps we shall have to consider this reaction to error. In the meantime, it is well to note that while the teacher is braced up to expect all manner of errors, he keeps his state of tension to himself. It is quite a proper attitude to expect a certain error to occur, but it is not proper to express this expectation except under certain conditions, as, for example, when the making of the error has been a prearranged step in the progress to a true conclusion. The teacher must be intelligently prepared for all manner of errors, but he need not take his pupil into his confidence. His position is really like that of a fencer who does his best to anticipate the moves of his opponent, while giving no indications of what his own movements are likely to be. No doubt pupil and teacher are not exactly opponents. But while they are partners they are not equal partners, and since their common interest is the improvement of the junior partner, it is often quite essential that the senior partner should keep his own counsel.

It is possible that in the working of this partnership the teacher may not only see things that are beyond the vision of his pupils, but he may actually be able to exercise the prophetic art, and anticipate errors that are on their way to birth. The experienced and skilful teacher dealing with a subject with which he is familiar can often anticipate the kind of error that is likely to emerge at certain stages in the study of that subject. In the old days of "payment by results," in the British schools a bare pass in various subjects had a clear monetary value, so it was of the utmost importance that errors in the examination should be as far as possible eliminated. To this end the plan was frequently adopted of keeping a teacher at the same grade for year after year, with the result that he acquired an almost uncanny knowledge of the kind of errors that were likely to occur at any particular part in the year's course. Further, such teachers could often tell within a very narrow range the percentage of pupils who would go wrong in a specific way in a given type of problem. Knowing the probable line of error of his pupils, the teacher naturally made his arrangements accordingly to prevent these errors arising, and was often able in this way to prevent the occurrence of errors that would otherwise inevitably have appeared. In such cases the sole purpose of the teacher was to avoid errors. It may be questioned whether this anticipation of and warning against possible errors is educationally sound. There is the possibility that the pupil may learn from his errors. Sometimes it is even suggested that he may learn more from going wrong and

getting put right, than by going steadily along a blameless, errorless way. Demonstrating teachers of chemistry, when an experiment made before the class fails, are fond of saying that we learn more from our failures in this sort of work than from our successes.

Indeed, among intelligent teachers there is a widespread belief that error in certain directions is, if not actually to be encouraged, not to be too vigorously discouraged. If we learn by our errors, it is not unnatural that we should regard error as a way to truth. It is commonly said that in the rough and tumble of life we learn mostly by trial and error, and teachers sometimes get it into their heads that as this is a recognised method of learning we should not be too officious in anticipating, in the sense of preventing, an error. In fact, at this stage we may as well refer to a form of utilising aberrations from the straight path as a means of keeping permanently to it. The medical figures that we have already used give a sort of justification for the introduction of a doctrine—now happily discredited—by which the medical process of inoculation might be applied metaphorically to moral training. If in medicine it is a desirable thing to introduce a mild form of disease in order that a more severe form may be averted, why not apply the same principle to education; and in order to avoid serious moral slips encourage minor moral slips? It used to be suggested that by a sort of cathartic process the introduction of a little vice may purify the whole system without any serious disadvantage. This is what underlies the process formerly looked on with a benevolent eye, and

popularly known by the tolerant term "sowing one's wild oats."

Sometimes a mild sort of defence was set up, in which Aristotle's theory of the cathartic power of the drama in relation to real life was used for all it was worth; but even that justification is no longer attempted, the whole scheme is regarded with suspicion, and its victims get little public sympathy. The genial tolerance generated under the theory has now disappeared, and it is recognised that the only thing that the young person learns from practising mild vice is skill in carrying on vice that is not so mild. "Boys will be boys" is the best that the modern lenient man can find to say, and that never gets the length of condoning positive vice, but is limited to over-exuberance. Young people who went wrong under the inoculation theory certainly erred from the true path, but it was not an error of judgment. They were quite well aware that they were wandering from righteousness, so their sins do not quite come within our purview in this book, though their elders who promulgated the inoculation theory were certainly guilty of cognitive error. In the past (and probably to some small extent in the present) some people went into evil courses in the false belief that a little vice was good for the moral system, and braced up the character. This was certainly an error in our sense, but not one that calls for serious attention in connection with school. But in any case the whole Wild Oats theory has been so thoroughly discredited that it need not take up any more of our time.

The contamination underlying the application of the inoculation theory, which more than anything else led to its abandonment, suggests the consideration of a process of carrying on education in a negative way by the correction of errors. This method became most prominent in connection with examination work, in which certain errors were used as tests. Obviously if people are able to correct errors they must know the truth. Knowledge of spelling and punctuation may be tested by giving the pupil an exercise in dictation: but it may be also tested by giving him a badly done dictation exercise to correct; and in certain official examinations this correction method was actually adopted. As an occasional exercise there is no great harm in the use of this negative form of test. But if it were to be used systematically in the teaching of spelling, serious objections arise. What is wanted is the strengthening of the positive, not the disturbing influence of the negative. Familiarity with correct forms is of fundamental importance, so everything should be done to encourage fusion of many instances of the correct form. Every time a wrong form is presented we have arrest instead of fusion, with the result that a wrong impression is left on the mind.

Underlying all this we find the doctrine of the "awful example." It is sometimes sought to eliminate errors by showing them up in their unpleasing form *as* errors. The plan appears at its best in moral matters. When the Spartans demonstrated to their young people the hideousness of drunkenness by making their helots intoxicated, the method

was excellent (the helot's point of view being, of course, conveniently ignored altogether). But when it comes to illustrating how to do a thing, it is generally better to keep to the positive rather than the negative, to show how to do rather than how not to do. A criterion to determine when the awful example may be used and when it had better be avoided may be found by determining whether the pupil can by his own unaided powers determine which of the two points in question is the one to be desired. Between a drunken and a sober helot there is no difficulty in choosing; between *seize* and *sieze* the selection is often puzzling, and a decision can be made with confidence only after a long series of *seizes* has fused into a very firm form that can stand the assault from any odd *siezes* that may come along. But even a well-established *seize* may wobble a little if too many *siezes* find their way into a teacher's consciousness as he marks a set of papers. If any means can be found to anchor a special form to a word, this state of unstable equilibrium may give place to a stable one. To the ordinary pupil *indispensible* seems as respectable as *indispensable*, and *parrafin* as blameless as *paraffin*. But if he learns that *paraffin* comes from the Latin *parum* and *affinis* he becomes stable on *paraffin*, though he may remain wobbly about *indispensible*. Naturally all such aids have great prophylactic value, and should be liberally used.

On the cognitive side there is a sort of parallel to the inoculation method, for some teachers use the plan of leading the pupil into error the better to bring him to a firm grasp of the truth. They

set what they call mistake-traps, and rejoice when they succeed in leading their unwary pupils astray. The plan is not a new one, though it is beginning to be used in a more scientific way than formerly. It is even applied outside of school, on what may be called the recreative plane. A great many of the riddles and other verbal puzzles in which most children delight, depend for their power upon the insidious bias they impose on the straightforward but suggestible young people. The secret of the successful riddle is to present matters in exactly the opposite way to that which ought to mark the skilful and honest teacher. We have here, in fact, an excellent illustration of the plan of bringing out the meaning of a term by expounding its opposite. For the riddle-maker is precisely the opposite of the school expositor. While the teacher legitimately practises prophylactic methods, the riddle-maker uses the arts of mystification. The purpose of the riddle is to cause misunderstandings, not to avoid them. So far from trying to secure immediate and accurate reaction to the apparently plain facts he introduces, the riddle-maker assumes an air of great simplicity and straightforwardness, labouring to all appearance to make everything clear, and yet insinuating here and there suggestions that tend to divert his victim from the path of truth. The attention is drawn from the point that is essential and directed to something that is striking but non-essential, or definitely misleading.

Sometimes a deliberate balancing of opposing qualities may produce a striking confusion of thought. A whimsical inspector of schools introduced mental

disturbance in all the women's training colleges of Scotland during his visits one year, by asking the students the interesting question: "Whether would you rather have a half hundredweight of whole sovereigns, or a whole hundredweight of half sovereigns?" Not only were the vast majority of the young women content to accept either offer indifferently, but a quite appreciable percentage remained of the same opinion even after the fallacy had been pointed out, so strong was the bias produced by the careful balancing of the whole and the half. The most satisfactory way to get the students to realise the true situation was to separate the halves and wholes altogether from the coins, and ask the students merely whether they would rather have a half-hundredweight of gold or a whole hundredweight.

It is clear that in such problems the trick consists in raising a state of expectation directed to a wrong point. When the problem is put: "A blind beggar had a brother who went to sea and was drowned. The man who was drowned had no brother. What relation was the blind beggar to the man who was drowned?" the whole point is the emphasis on masculinity. The words *brother* and *man* are brought prominently forward, while the femininity of the sister is cloaked under the common gender of *beggar*.

Teachers sometimes adopt a more deliberate method of applying the mistake-trap, and use it in class instruction. It is less generally applied than it used to be. Formerly it was common in the elementary mathematics class-room, particularly in

geometry. The master would stand at the blackboard, compasses in hand, and would obey every instruction given by the pupil, but wherever possible breaking the spirit of these instructions while obeying the letter, and thus leading to silly situations on the blackboard that called for intelligent work in disentangling the errors involved. The general effect was good, for it made clear to the pupil the looseness of his directions, and thus taught him caution. It put the pupils on their mettle, and now and again they got a chance of getting a little of their own back at the expense of the instructor. On one occasion in an English elementary school the method was employed by an inspector, who asked the pupils to mention any number below a hundred. One pupil suggested fifty-nine, and the inspector punctiliously wrote on the blackboard the figures 95. Another pupil suggested twenty-seven, and again the children were mystified by the inspector putting down the figures 72. By this time the clever boy of the class rose to the occasion, and remarked, "Sixty-six, and see if you can muck that up."

It may be said that such an answer justifies the process, for it produced, at least in the case of that one boy, a state of mind entirely on the lines of what the true teacher wants. Indeed, from this point of view, there is a good deal to be said in favour of deliberately misleading pupils. One condition must be laid down which has to be fulfilled before the method can be wholesomely applied. This is, that from the circumstances of the case the pupil can be led to discover for himself wherein the

error consists. If he follows the teacher blindly into error, no harm but some good may result if the teacher, by suggestion and partly by confrontation, can produce such a collocation of ideas as leads to uneasiness in the pupil's mind, and a vigorous striving after internal harmony.

One rather important evil effect of the deliberate mistake-trap is to be found in the pupil's loss of confidence in the teacher. If he sets about systematic mistake-trapping, he may arouse an unwholesome degree of suspicion. This was recognised by Socrates himself, who in his figure of the torpedo shock illustrated the paralysis induced in those to whom his method was applied. Socrates in fact made a large use of mistake-traps, and a good deal of the dramatic effect of his talks is obtained by leading his interlocutors to commit themselves to statements that will not stand examination, and then exposing the underlying errors. But his method is more suited for grown-ups than for youngsters. It was one thing to bring the haughty Athenians off their high horse and teach them humility; it is another to reduce school pupils to a state of intellectual timidity that prevents them from thinking clearly. No doubt there are certain types of pupils who are none the worse of being treated occasionally to the Socratic irony, with its resulting mortification, but as a rule this irony is an excellent thing to omit in school work.

Another way of regarding the mistake-trap plan is as an organised form of trial and error. The ground is prepared by the teacher beforehand, the mistake follows in natural course, and the results

are manipulated in such a way that the error is not only recognised but supplies a challenge to discover some way out of the resulting difficulty. After a little gentle exercise in the manipulated mistake-traps, the pupils acquire a greater skill in dealing with mistakes that occur without any co-operation from the teacher. As cramming, though in itself inadmissible as a part of the training supplied by school, may be taught as a process to be used in after life, so mistake-traps may be utilised in such a way as to train the pupils in the manipulation of errors in general.

It has to be noted that while in the Socratic dialogues the torpifying effect of the torpedo shock is clearly set forth, there is no apology forthcoming. Socrates makes no promise that he will mend his ways and give up his usual procedure, even though it appears to have this numbing effect on his hearers. We must accordingly consider whether there may not be some compensating effect of the temporary paralysis. This may probably be found in the caution and alertness developed in the mind of the interlocutor as a consequence of the Socratic treatment. In actual practice it is found that the application of the method with the full rigour of the game results in a gradual—sometimes a rapid—drying up of the answers from a class. The pupils soon realise that whatever they say will be, in the police phrase, “used against them,” so they find it safer to hold their peace, preferring to be scolded as a class to being pilloried as individuals. But this result is due not to the method in itself, but to the spirit in which it is applied. It is the æsthetic side,

not the cognitive, that is at fault. Pupils do not resent having their mistakes exposed, so long as the exposure is done in a kindly spirit. No doubt the teacher is entitled to show up errors with a certain amount of disagreeableness if these have resulted from carelessness or laziness. But in such cases we are dealing rather with moral questions than with intellectual, and different standards must prevail. But if a pupil falls into an error in a natural way, following the ordinary mental laws, he welcomes, rather than resents, having his attention called to his deviation, especially when the whole process includes a redirection of his efforts resulting in ultimate accuracy.

The unpopularity of the Socratic method in school results entirely from its moral reactions. Here indeed we have only a special application of a general principle of class-teaching. In dealing with pupils you may say almost anything you please in the way of reproof without alienating their good feeling, so long as you say it in such a way as to give evidence of your own good feeling to them. It is not so much what you say that rouses resentment, as how you say it. Error may be so manipulated as to make the pupils find out where they have gone wrong, with the result that they blame themselves for their aberration without at all including the teacher in their condemnation. Even when the error has in the last resort to be pointed out by the teacher, there is no resentment so long as there is no gloating over the slip.

Elsewhere we deal with the plan of partnership in the pursuit of error. Here we may take up the

idea of making our attack on error a kind of game. Underlying the *Play Way*, elaborated by Mr Caldwell Cook, is this fundamental principle of treating the various kinds of school work as matters to be dealt with in the spirit of play. He has no patience with the idea of making school work merely a form of easy-going recreation. What he wants is the introduction into school work of the zest and vigour that accompany what we usually call games. From this standpoint we may treat our various studies as kinds of games, without introducing into them the "ungirt" attitude that is associated in the minds of many people—most unwarrantably—with games. In his playing the pupil finds no lack of errors, mistakes, fozzlings, call them what you will, but does not on that account find fault with the game, or with his opponents. So in study, when approached in the spirit of the game, errors are things to be avoided and removed. If then the teacher so manipulates matters that certain errors almost necessarily find their way into the pupil's experience, there may arise quite a friendly competition between instructor and instructed. The same spirit that gives to riddles of all kinds, cross-word puzzles, and other challenges to the intelligence, their charm for youngsters, may be utilised in the school world. Naturally the pupil must not be so treated that he regards the whole of school work as a kind of game, in which he and his teachers are opponents. There must be a great deal of the humdrum: work must go on in a more or less matter-of-fact way: but, whenever occasion offers, pupil and teacher alike should be ready to adopt the play

attitude, and in both the literal and the metaphorical sense "play the game." The result cannot fail to be prophylactic in the matter of errors.

The most direct way in which pupil and teacher are brought into communication with each other is by the interrogation point. It is far from the only way, and some teachers go to excess in its use; but it is a very effective mode of approach, tends to save time, and may be wisely used wherever a longer method does not justify itself by a greatly superior educational effect. For sometimes it happens that a rather roundabout method produces better ultimate results than the more direct, and in such cases the teacher must determine whether the better result is worth the additional expenditure of time. We shall consider at a later stage the principles on which the relative values of the direct and roundabout approach may be determined. In the meantime we have to consider how far the interrogative method can be so applied as to have prophylactic results.

The form in which a question is put has a great deal to do with the possibility of producing a false answer. Teachers do not always realise that there are some questions that do not involve any problem at all. They are merely the statement of the first part of a proposition with the suggestion that the second part be added. Catechisms are usually drawn up on this principle. The question really leads up to a categorical answer, and in some cases the total catechism is so arranged that by leaving out the questions the answers may be read off consecutively as a positive exposition of the sub-

ject under treatment. It does not follow that the catechetical method is necessarily easy, or that it tends to lead to error. But when answer and question are learnt together it certainly leads to a mechanical way of dealing with a subject, and does not encourage thought. On the other hand, there are certain questions barred in courts of law, but often used by teachers, sometimes deliberately and sometimes without their being aware of their true nature. These are known as "leading questions." The objection in law courts is that such questions suggest a particular answer, and therefore unfairly influence the thinking of the witness. Sometimes these questions take the form of a sort of mistake-trap, that may be called a truth-trap. If, for example, there are two suspects, a man and a woman, and the examining lawyer asks something like this: "Was it on entering the room that she dropped the paper?" he may surprise a witness into tacitly admitting that the guilty person was a woman. Teachers can easily, and some do, put questions in such a form as to suggest a particular answer, and in this way can elicit a wrong answer without the pupil knowing that he is being misled. On the other hand, more frequently than many teachers realise, pupils play upon their teachers' reactions so as to determine on psychologically speculative grounds the sort of answer that will meet the case. Unless when working a mistake-trap, then, the teacher must do all he can to avoid the leading element in his questions. He must put them as directly as possible, avoid all ambiguity, and set forth the matter in such a way that the answer

cannot be exposed to the hazard of the heads-or-tails choice.

In the old-fashioned method-books it was laid down as a fixed rule that questions should never be put so as to call for a mere "yes" or "no" answer. The rule is an excellent one, but there are exceptional circumstances under which such questions may be permitted. Sometimes the teacher uses what may be called rhetorical questions, that have a value in themselves on the emotional side, though not on the cognitive. Suppose that in a moral lesson, or in an appreciation lesson in literature, the teacher wants to carry the class with him, and yet does not want to stop to argue about any point, he may well ask rhetorical questions to which he no more expects an argumentative reply than does the clergyman at a christening when he says to the father: "That is your belief, is it not?" It is only when a question involves a problem, however simple, that a yes-or-no question must not be set.

All other questions should be fool-proof if error is to be reduced to a minimum. They must, of course, be intelligible to the pupil. They must admit of only one meaning in substance, though of course they may admit of an infinite variety in the way of expressing it, without including error. Every time that the pupil gives an answer that the teacher did not expect, and yet is a correct reply to the question as set, it should be counted to the pupil for righteousness, though from the big outside point of view it is wrong. For example, if the teacher of the alphabet class, to aid the child to name the letter B, asks, "Well, what comes after

A?" and gets the answer, "All the other letters on the sheet," he has no cause of complaint. The pupil has correctly answered the question. Cases of this kind occur not uncommonly when confusion arises between connotation and denotation. "What is an object?" asks the teacher connotatively. "Johnny Smith," replies the young Scots pupil denotatively, for in his country a malformed child is called "an object."

Special care should be taken with regard to certain interrogative terms. *How* and *Why* and *What* and *Which* are notoriously dangerous words, producing generous crops of errors that should not appear if the teacher first of all studies the words carefully and makes sure that his pupils also understand them. Teacher and pupil as partners must come to a common interpretation of the elements of their means of communication.

Coming to still more direct prophylactic school practice, the teacher must prepare himself for each lesson by exactly delimiting the area that he proposes to cover in the time allotted. This demands a rapid review in his own mind of the matter to be dealt with in the lesson, and an equally rapid review of the mental content of the pupils on this part of the subject. Teachers often make the serious mistake of supposing that because they are well up in a subject they do not need to make a careful preparation for each lesson in that subject. They ask contemptuously whether they are to be expected to go over again all the childish details of a subject they have at their finger-ends. The reply is that the children do not have this familiarity with the

matter, and that therefore the teacher's very facility with the details will expose him to special dangers in the way of leading his young people into error. The teacher's preparation is not for his own benefit, but for his pupils'.

Once this preparation has been made, the next process is a deliberate approach to the subject from the pupils' standpoint. Many teachers, particularly those of a specially logical turn of mind, make the serious mistake of arranging their matter in a precise and methodical manner, looking at the whole situation merely from the point of view of the proper arrangement of the subject-matter, the *docendum*, on a logical basis. The ordinary text-book is very apt to adopt this logical attitude, and to let the subject-matter dominate mode of presentation. But the teacher's aim is best secured by keeping the pupils in the limelight, and fitting in the subject-matter to their needs. Only in this way can the co-efficient of error be reduced to its minimum. Indeed, the difference between the teacher and the text-book comes in just here. The text-book is accurate and logical, but it is inflexible. The pupil must accommodate himself to the book's rigidity, whereas the teacher forms an organic connection between the subject-matter and the learner. The master can watch the learning process and guide it by the light of his observation. No doubt in actual practice a great part of his work will consist in correcting errors that have really occurred, but a sympathetic teacher, making himself complete master of the situation from the pupil's point of view, will be able to anticipate and guard against

a great many errors that would otherwise be inevitable. There might be something in the argument that it is not desirable to remove all the difficulties from the path of the learner were it not for the fact that there is no fear of the supply of errors giving out. If there were any danger of carrying the elimination of errors to such a pitch that not enough material would be left for the pupils to sharpen their wits on, then it might well be that the teacher should relax his efforts. But as things stand, the elimination of a large number of errors will merely hasten progress, while there arises at a higher level an ever-renewed body of errors to be dealt with to the pupil's advantage.

We have seen what a fruitful source of error is furnished by words. Accordingly, the pupil's vocabulary is a very vulnerable spot, and the teacher's prophylactic treatment may well include a consideration of the verbal means of communication. As the teacher is expected to make himself familiar with the mental content of his pupil, so he must master the limits of the words at the disposal of the pupil. Not only is the pupil's vocabulary much narrower than the teacher's, but it is less stably connected with the various items in the mental content. Accordingly, the teacher must be particularly careful not to use terms that do not form part of the pupil's vocabulary, and he must see that the words he uses are applied in the proper way. This can be best accomplished by a judicious use of synonyms, and by a steady repetition of the same idea in different words. Some of the graces of style must be given up in favour of absolute clearness.

Verbosity, tautology, pleonasm lose their bad connotation and take on an odour of sanctity in dealing with young children just feeling their way to a sufficient vocabulary. No doubt at the higher stages the teacher's style ought to be a model for his pupils, but at that stage there is already an established vocabulary, and a deliberate enrichment of the pupil's store of words may well be attempted. At the earlier stages the teacher must always keep in view the danger of misunderstandings and must manipulate his own vocabulary accordingly.

Teachers are continually expressing surprise at the misunderstandings that arise in connection with words. Such astonishing perversions occur that thoughtful people are inclined to say that there is no good in trying to anticipate possible lines of error. This complaint comes more frequently from the cleverer teacher, who is repelled by the persistence with which pupils misunderstand what to him are the plainest, starkest statements. But it is possible to take certain precautions that will at least reduce to a minimum the chance of pupils going wrong in the uptake of words. The most important of these would appear to be the appeal to two senses instead of merely to one. This applies specially to the case of proper names. These are frequently taken up inaccurately, even when the teacher is careful in his pronunciation of them, for the pupil has no standard by which to regulate his rendering of what his ear communicates to him. The lecturer on education had been giving an account of the *Play Way* as practised by Mr Caldwell Cook at the Perse School, Cambridge, and at the ensuing examination students

rendered the name of the school in a variety of spellings, the following three forms being the most frequent: Perse, Perce, Purse. The word written on the blackboard would have narrowed the possibility of error, and would have formed an almost perfect prophylactic.

It is only natural for eager teachers to complain that they cannot afford the time to write down every proper name, and that such interruption breaks the current of thought when they are in full swing in dealing with the subject-matter. But if the correct spelling of the school in the above case is worth while marking as wrong in the pupil's script, it is worth the teacher's while to take all reasonable precautions against the error occurring at all. Indeed the need for such prophylactics is not confined to proper names. Wherever a term of an unusual kind is employed it should get the insurance of the blackboard. In lecturing to a class in an American university, contrasting the two types of teachers—those who overemphasise the need for disagreeable work in school, and those who go to the other extreme—I used the terms “good-old-grinders” and “primrose-pathers.” In a subsequent examination I found that a couple of students had written of “the primrose fathers.” The context showed that the students in question quite understood the meaning of the phrase, and I suspect that a predisposing cause of the error lay in a subconscious stimulation of the familiar American phrase, “the Pilgrim Fathers.” But in any case the writing of the word on the blackboard would have rendered the distortion less likely.

Naturally we must take for granted the great body of language as common ground for teacher and pupil, and the teacher cannot be expected to anticipate on the blackboard every possible difficulty. Indeed, there is a type of teacher who wastes much time in writing out laboriously a great deal of useless matter. But proper names and peculiar expressions are entitled to the additional publicity accorded by the blackboard. Clear enunciation does much to minimise the possibility of error in this direction. Some teachers take a middle course here, and compromise by pronouncing the word clearly, and then spelling it orally, thus saving the time involved in chalking it up. Still, this method has the disadvantage of confining itself to the one sense, and loses the advantage of the appeal to the eye, except at the second remove.

In the rapid give and take of class-work there is a way in which error may be anticipated and avoided: that is, by pointing out the different meanings every time homonyms are used, or ambiguous terms are introduced. We cannot anticipate every possible misconception on the part of pupils. For example, most teachers would be honestly surprised to have in response to the question, "Who came first out of the Ark?" the answer, "I don't know who was the first, but I know that Noah was the fourth." Investigation showed that this statement was based upon the words "Noah came forth." We cannot be expected to anticipate every such freakish misreading, and there is a certain danger that teachers may bore and even mislead their pupils by continually introducing alternatives, *e.g.* "Noah came forth

—that is, came out.” More pardonable is the plan some teachers have of introducing the “not so-and-so, but such-and-such,” for this locution is seldom used unless in a case where a certain probability of doubt is present. “The rites of the church” is a phrase dangerous enough to warrant the interpolation “r-i-t-e-s, not r-i-g-h-t-s.” A rough-and-ready definition is often in place in this prophylactic process. We have dealt already with the general problem of definition in instruction, but a passing indication of the meaning of a word or phrase is quite permissible as a preventive of possible error. Very often the pathetic “I thought you meant so-and-so” from the pupil would have been avoided if some specific explanation had been thrown in during the course of the lesson.

There are, of course, limits to the application of this running explanatory comment. A point is soon reached at which confusion and not enlightenment follows. The failure of this form of the prophylactic method is well exemplified in the following passage from a recapitulatory address delivered by a Sunday School superintendent who had evidently made up his mind that there should be no room left for not understanding what he had to say:

“When Joseph’s brethren saw him approaching—that is, coming, you know—they consulted among themselves—that is, took counsel among themselves or discussed the matter among themselves, tried to make up their minds what to do. So they resolved, determined, you know, made up their minds—to kill him. But Reuben wanted to save him, so he suggested—hinted, said, you know, oh

yes, advised them to put him into a pit, and he would get him out privately—secretly, quietly, without letting the others know, and bring him safe to his father. So they did this, and soon a caravan—that is a troop with horses and camels and asses and merchandise—that is, goods, you know, like oil and spices—what your mother puts into cakes and puddings, you know—this caravan of Ishmaelites—just what we call Arabs now, they were descended, that is sprung from—I mean Ishmael was their grandfather, or at anyrate their forefather—Abraham's son, you remember, that was sent into the wilderness.”¹

We have here a sort of *reductio ad absurdum* of the running explanatory commentary which breaks down under its own weight. An occasional interpolated “meaning” is quite permissible, but when explanation is heaped on explanation we have a case of “cycle and epicycle, orb in orb,” and the speaker brings darkness where he sought to shed light.

An excellent form of prophylactic teaching is the presentation of the same matter from several points of view. It is here that class teaching has a certain advantage over private coaching. The teacher with but a single pupil may present the matter in the way that he knows will best meet the needs of that pupil, and pass on. The class teacher, knowing the variety of minds he has to reach, will present the same matter in different ways so that by one or other of them he may meet the case of every pupil in the class. Had Viola's mission to Olivia in *Twelfth Night* been presented from several points of view, the tailor standpoint would not have remained in the mind of the pupil who evidently

¹ *Primer on Teaching*, J. Adams, p. 58.

associated the tailor's goose with the *pressing of Orsino's suit*, for he evidently thought the phrase had something to do with Viola's dressing up as a boy. The trouble of this varied presentation is that it tends to bore the cleverer pupils, but the skilful teacher can get over this difficulty by calling in the aid of the abler pupils in the changing presentation. By taking them into partnership he retains their interest, gives the duller pupils a chance of picking up the true meaning of the point under discussion, and leaves the abler pupils with an *enriched* knowledge of the point, even though they understood it quite clearly at the first presentation.

The value of this varied approach is often shown by the interruption of the second presentation by a pupil who protests in some such form as, "But you said so-and-so," referring to some point in the first presentation that, from the pupil's point of view, is inconsistent with the second. This indicates that an incipient error has been nipped in the bud.

Another excellent prophylactic is to make sure that you say all that has to be said on the point under discussion. This does not, of course, mean all that the teacher knows relevant to the situation. Thackeray speaks somewhere of people who become bores by insisting on saying all that can be said on a subject. Nothing is more common in teacher experience than to be surprised that it was necessary to say something that "any sensible person would know without being told." One Friday lately I gave to my university class a couple of themes on which they were to write for the following Friday.

It turned out that the second of these themes had not been touched upon in class, and needed further explanation. Accordingly, I advised the students to work out the first theme for Monday, and leave the other till after the Monday's class. Several of the students interpreted this instruction to mean that they were to bring one theme fully worked out for Monday, and postpone the other till the usual day—Friday. My meaning had been that the two themes should be presented together on Friday as usual, the suggestion for delay in writing the second being merely for the guidance of the students in planning out their work at home. Obviously there was room for doubt in their minds, and therefore I had failed in making myself clear. I had not said enough. Sometimes we cause confusion by saying too much, as was illustrated when we were dealing with excessive explanation. What we must do is to get the happy mean between the lack of the essential, and the superfluity that leads to confusion and boredom.

CHAPTER VII

CAUSES OF ERROR IN THE PROCESS OF INSTRUCTION

WIELDING his big broad brush, Bacon outlined in his "Idols" the predispositions to error of all kinds by all sorts and conditions of men. In this book we are concerned specifically with errors that occur in school. Yet, since pupils and teachers are in the last resort human beings, they are open to all the predispositions set forth in the "Idols," and teachers do well in keeping a careful eye on the wider possibilities of error. Still, the special field of error that calls for our attention here is the school-room itself, and in the process commonly described as instruction. It is true that wider considerations thrust themselves in whether we will or no. The teacher can never in real life keep instruction and education entirely apart, nor should he try to. All the same it is profitable to study separately certain aspects of our work in order the better to understand and the more skilfully to deal with them. It is merely a particular application of the general principle—divide and conquer.

From the point of view of the plain man, the ordinary member of society, error may be roughly taken to be any disagreement between his inner world and the everyday outer world. "Things as they are" is the sort of criterion that may be

adopted as the general standard of truth and error. But when it comes to the limited range of instruction in the school-room, a different sort of standard must be adopted. Here error may be treated as any discrepancy that may arise between the teacher-mental-content and the pupil-mental-content. If instruction is taken to mean the carrying-over of a block of matter from the teacher-mental-content, and establishing it as a part of the mental-content of the pupil, it is obvious that any lack of agreement between the two mental-contents when the process is completed must be interpreted as indicating error. Note that the demand is for agreement, not identity.

The result of the teacher's work is seldom an identity between his mental-content and the pupil's; it is usually a community without disagreement. In a given area two minds may have the same mental-content in a general way without having literal identity. Two boys, for example, have learnt the geography of India in the same class, under the same teacher, from the same text-book, and from the same map, and yet each boy may differ widely from the other in the way in which he knows the facts and in the attitude he adopts towards them in real life. The previous mental-content in each case, the individual qualities of the two boys, their social status, their outlook, and prospects, may give the two Indian clusters a quite different dynamic power. But there is no element of error necessarily involved within the limits we have set ourselves. Each of the two pupils reproduces accurately in his own way the cluster that

already existed in the mind of their teacher. The pupils may in after-life make mistakes in the application of the knowledge of Indian geography they have acquired at school, but these will be errors of life, not of school.

There is indeed quite a sufficient range of possibilities of error within the limits we have set ourselves: these being the limits of the teacher-mental-content and the pupil-mental-content. Experienced teachers never tire of telling us how ingenious pupils are in making mistakes. Unwise teachers not only feel but express great surprise at their pupils' skill in making blunders. No doubt it is irritating as well as astonishing to find how often and how far our pupils can err. But it does not become the professional teacher to make a song about it. Anyone accustomed to the atmosphere of class-rooms is familiar with the age-old lament of the astonished teacher: "How *could* you make such a blunder?" With monotonous regularity comes the pathetic refrain: "I could understand your making this, that, or the other blunder, but how you could go wrong in this particular way passes my comprehension." This may be all true, all regrettable, but why make a public exposure of professional incapacity? The teacher may not know the cause of the error; so much the worse for him. He ought to know. It is his business to know how and why a pupil goes wrong; that is one of the things a teacher is for. The pupil has made the error; he has contributed his share to the teaching-learning process; it is the teacher's part to take the matter up and put things right. If there is to be rhetoric at all, it ought to take

the form rather of an apology than of a philippic. Our business is to find out just how the pupil went wrong in this particular case, then to discover how to make him realise his error. At the third remove lies the discovery of a way to prevent the recurrence of this particular type of blunder.

In order to get into the proper state of mind with regard to errors, we must consider their causes. Bacon has given us some help in dealing with mankind's general tendency to err, but we need to look into the matter, from the standpoint of the professional teacher. We need, in fact, to consider what may be called the *Idola Scholarum*, the idols of the schools in the ordinary sense of the word school. It may be suggested that these idols are merely a variety of the idols of the theatre, but it is better to drop the Baconian classification altogether at this stage and approach the subject from a definitely professional point of view.

To begin with, the *Idola Scholarum* in the widest sense must be held to include all sorts of errors, moral as well as cognitive. We cannot, even if we would, exclude entirely the moral aspect; but we can quite well keep it in a subordinate position and deal with it only when it thrusts itself under our notice. This it hastens to do, for at the first point we raise it feels itself justified in claiming attention. Even when we limit ourselves to the cognitive side, and consider only errors that arise in the actual process of instruction, we cannot begin an investigation into the causes of error without coming in contact with moral forces. A great number of the predisposing causes of error in the process of

instruction are not intellectual at all, but moral, and must be considered if we are going to do the best for our pupils by minimising the force of predispositions to error.

To be perfectly fair to our pupils, indeed, we must go still farther and take account of the purely physical aspects of the problem. The physical conditions under which our pupils work cannot be said specifically to cause errors, but they certainly have a definite effect in predisposing towards error. The temperature of the room, the ventilation, the incidence of the light, the position of the black-board, the nature of the desks and their arrangement have all an influence in producing a state of mind favourable or unfavourable for error-making.

At the next remove, in considering physical influences, we have to take into account all the individual characteristics of the pupils. All the ordinary defects (weakness of eyesight, dullness of hearing, bluntness of touch) contribute their share in predisposing to error on the instruction side. The strain involved in trying to exercise the senses in the same way as their normal fellows, produces in the slightly abnormal pupil an unwholesome state of mind, and there is in addition the inaccurate presentation of data from the outer world. Frequently the pupil will make a perfectly true report on what his senses have told him, and yet the result will not bear the test of comparison with the outer world.

The sort of error that is produced by the inefficient working of any of the senses is paralleled on the general scale by the effects resulting from

fatigue. The distributed bluntness of perception produced by fatigue has such a close connection with the predisposition to error that the number of errors made under experimental conditions has been used as a measure of the degree of fatigue existing at a given time. The kind of error selected for this purpose is of the mechanical sort, not involving an effort of thought. Dictation, for example, has been used for this purpose. Two passages of as nearly equal difficulty as possible are chosen. Both must be quite within the range of the pupils' powers; every word in them is to be familiar to the pupils and within his range of spelling without any difficulty, so that any errors that may arise must owe their origin to some disturbing influence. To estimate the fatigue-producing power of certain school subjects, the test is made of dictating to the class one of two selected passages (of equal difficulty) just before a lesson is to be given on the subject in question, and the second passage immediately after the lesson has been given. It is found that, speaking generally, there is a higher percentage of errors in the dictation that follows, compared with the dictation that precedes the lesson, the amount of increase indicating the index of the fatigue-producing power of the subject tested.

It is worth noting in addition that the fatigue may be produced either by mental or by physical exercise, without affecting its power to increase the tendency to error. Psychologists and physiologists must settle among themselves whether fatigue is one and indivisible—whether, that is, mental and physical fatigue are identical, though the first is

produced by exercise of the mind, and the second by exercise of the body. For our purpose it is enough to know that fatigue of any kind acts as an encouragement to error.

Psychologists sometimes go the length of classifying the various school subjects according to their fatigue-producing power. In the lists that they publish, mathematics usually holds the place of honour at the top. Unfortunately, however, we cannot make much use of these order-of-merit arrangements, for they tend to vary according to the means adopted to determine the degree of fatigue produced. We naturally expect to find a fairly high correlation between the fatigue-producing powers—sometimes learnedly called *ponogenetic*—and the error-producing powers, which we may, in retaliation, call *ptaismagenetic*. In plain English all that this amounts to is that certain subjects have more power than others to produce fatigue, and that those subjects are accordingly more likely to produce a condition in which it is probable that error will occur. The subject-matter, the *docendum*, then, must be taken into account in any investigation into the production of error; but it is only one of a large number of elements that must be considered, and these have to be taken up in their order.

When we come to the moral predispositions to error we find such influences as indifference, sloth, carelessness, the effects of which are painfully patent to every teacher, the treatment of which forms a part of the big general problem of character-moulding, and is therefore beyond the bounds of

our present enquiry. There is a danger, however, of the moral and the cognitive aspects getting a little mixed up in this connection. The term *error* is sometimes rather loosely used here. To get drunk is a moral offence; it can hardly be properly described as an error. But if a man on a certain occasion thinks he can safely venture on another glass, and the result is disaster, we call that an error; it is a matter of mistaken judgment. For a boy to be insolent up to the limit of a master's endurance is a vice; but for him to go beyond that limit is an error; it is a blunder in knowledge; the boy miscalculates the length he can safely go. But while such distinctions are quite clear, he cannot separate the moral and the cognitive spheres so definitely all along the line. For moral considerations have a great deal to do with the origin of many forms of cognitive error.

This becomes particularly plain in all matters involving the problem of *interest*. If we had to fix upon any one influence predisposing to error that might fairly claim to be the most powerful, we would not go very far wrong if we selected *distraction*. To be sure there are many forms of distraction, but they have all the element in common that they depend upon the working of interest in the experience of the person under consideration. Anything that takes away the attention from the work in hand is a direct incentive to inaccuracy in that work, and the term *interest* is what is ordinarily used to indicate the power that, by concentrating attention in one direction, leads to distraction in another. The attraction may be either physical or

mental. All forms of anxiety have distractive power, but it must not be forgotten that not only unpleasant and worrying states of mind cause distraction. The same is true about pleasant experiences and expectations. So perhaps the best way of putting the case is to say that strong emotional excitement has great distractive power, and therefore tends to inaccuracy in all directions, but particularly outside of the area within which the emotion is manifested.

The teacher's duty with regard to these moral considerations is to learn as much about them as possible in general, and in particular to observe all the tendencies of his pupils in the matter of interest, and to use all this general and special knowledge to guide him in his dealings with the errors of his pupils. It may perhaps be suggested that in addition to the general tendencies towards error implied in the distribution of interest and the sense of responsibility among pupils, there may be a specific tendency towards error in individuals. This tendency, if it exists, may be called a constitutional tendency towards inaccuracy. When Emerson remarks that success is an hereditary quality, he probably meant not much more than to express in an epigrammatic way that certain traits that are hereditary tend towards success, and so at the second remove justify the statement that success itself is hereditary. In the same way we may say that inaccuracy is hereditary, the result of the transmission of certain qualities that make for error. Leaving out of account altogether the praise-or-blame attitude towards such things as

carelessness, sloth, lack of interest, we find that they do tend to encourage error, and therefore demand the teacher's attention, even though he limits himself to dealing with cognitive error. All such considerations as are involved in the quarrel between the "good old grinders" and the "primrose pathers," and in the fight between the "play way" and "thorough," must therefore be taken into account in our school treatment of error.

It is rather a begging of the question to consider stupidity as a predisposing tendency to error. It is often taken for granted that it is the special function of stupidity to make blunders, and this view after all may be true. But mental dullness need not necessarily manifest itself in making mistakes. It may exhaust itself in dull, slow plodding without any gleam of positive error. Herbart presents a special view of the case when he tells us that stupid people cannot be virtuous. To many of us this is a surprising statement. If stupid people cannot be virtuous, what in the world can they be? In the popular mind being virtuous is what they are specially good at. It is their strong suit. When we look into the matter, we find that the word Herbart uses is "stumpfsinnig," which literally translated gives us "blunt-sensed." Since we have seen that weakness of sense perception is a predisposing tendency towards error, we must admit that the Herbartian stupidity ranks in the same group, though we must not say that all kinds of stupidity are predispositions towards error. The stupid boy need not necessarily have a high co-

efficient of error, even if he has a poor co-efficient of attainment.

Slowness is sometimes treated as almost synonymous with stupidity, but curiously enough it has not a bad reputation in the matter of predisposing to error. Indeed its popular rating is positive rather than negative in the matter of error. "Slow but sure" would indicate a high accuracy co-efficient. But popular wisdom in these matters is little to be trusted. Practical teachers find their slow pupils not at all necessarily sure. Even stupid people can do stupid things with great rapidity; and in school-work a slow pupil can make his mistakes on equal terms with the quickest of his fellows. No doubt, in the case of slow pupils allowed to do their work in their own way, and at their own pace, as some of the newer plans of school organisation permit, the saying may be justified. But in the rough and tumble of ordinary class work the chances of error are great in the case of the slow pupil. Slow workers do not usually get the time necessary for the deliberate judgment that is natural to them. Accordingly, they have to jump to conclusions with what is for them insufficient consideration, with the result that their decisions have all the tendencies towards error that mark the hit-or-miss method that characterises the hare-brained. The temperamentally overquick and the constitutionally very slow are liable to error in about the same degree.

When all allowance has been made for general and particular, inside and outside influences leading to error, we come to the error-producing forces at work within the school sphere itself, and in the

actual process of instruction. Naturally, one of the most fruitful sources of error is to be found in sheer ignorance. We cannot make bricks without straw. But if there are no bricks there cannot be any bad bricks. Ignorance would seem to have nothing to do with error, since out of nothing nothing can come. Where ignorance leads to error is when it leaves the pupil at the mercy of other knowledge that is not to the point. If we do not possess the ideas necessary to criticise the material provided in a particular problem, we stand in imminent danger of being misled. It is not so much that we do not know, but that we do not know enough, or do not know the right things. On the famous occasion when Dr Johnson was asked by a lady why he had in his dictionary put the pastern of the horse where nature had not put it, his reply was: "Sheer ignorance, madam." He knew a horse had pasterns, but he did not know where to put them. Errors arising from ignorance are nearly all of this type. Mistake after mistake arises merely because certain data are not within the range of the pupil at a given moment. Anachronisms come under this head. Mistakes are continually being made in the history lesson, because pupils assume that their ancestors lived exactly as we do to-day. Writers of historical novels supply, on a more mature basis, the same sort of blunder, and their excuse must be the same. Dr Johnson's phrase might have been used as an explanation by the schoolboy who went so far wrong as to think that when the witch of Endor "called up" Samuel, she used the telephone.

A pronounced tendency to error is induced by

that state of expectancy that is common in school work, notably among eager pupils. They are interested in the work, and follow the teacher's thought keenly; in fact, almost too keenly. For they actually get in advance of him (in itself an excellent thing) and anticipate the question he is going to ask. If he fulfils their expectations and asks the anticipated question, all goes well. But it frequently occurs that he does not rise to their expectations, and their ready answer finds no welcome. It is a case of auto-suggestion, and the teacher must be continually on his guard against it. The skilful schoolman can anticipate in almost every case this tendency to follow a particular line of thought that fits in happily with the general line adopted in the class presentation. Expectation on the pupil's part must be met by anticipation on the teacher's. It is often a matter of the different mental speed of the teacher and the pupil. Though the teacher may think as quickly as the pupil possibly can, he is not always at liberty to go at his own pace, for he must carry the duller pupils along with him, and the delay that results often leads the quicker pupils to disaster. In class-work, errors of this kind are unimportant, for they usually carry their own correction with them. They occur in the case of clever pupils, who afterwards very readily orient themselves. It is different, however, in external written examinations, where too often the clever pupil, full of his subject, is led astray by expecting a question, and then treating one of the questions actually set as the one he expected. These "trigger questions," as they may be called,

set off the candidate on the wrong track, because he does not pause to read over carefully the whole paper submitted to him. Asked to give an account of the War of the Austrian Succession, the expectant pupil dashes off into the Spanish Succession because his mind is full of that, and the wording suggests it.

Another source of error is under-explanation on the part of the teacher. He sets forth all the information that he thinks necessary, and yet leaves something unsaid, because he takes for granted that the pupil knows the particular fact in question, and yet the omitted fact may prove the undoing of the boy. Naturally, the dull boy is more apt to come to grief in this way, though the clever boy has his own temptations, from which his duller class-mates are free. His very ingenuity in twisting round the facts at his disposal leads him into errors that would never occur to his more stolid comrades. A dull boy would never think of saying, as a clever London boy did, that the cotton gin was invented by a Chinaman, because his teacher had told the class that its inventor was a Yankee. The boy's ignorance of the word *Yankee* was ingeniously compensated by the separation into the two words *Yang Kee* that looked like enough the sort of words he had seen over Chinese laundries to lead him to his plausible misapplication. It had not occurred to the teacher to explain the word *Yankee*.

While under-explanation is a fruitful source of error, over-explanation as seen in the preceding chapter is not without its dangers. By going on elaborating a matter already quite plain to the pupils, the teacher may instil a certain doubt,

especially in the minds of the abler pupils, that there must be something more in the matter than appears on the surface, otherwise the teacher would not go on explaining. Accordingly, some elaborate and quite unnecessary meaning may be sought for and found by the more ingenious pupils.

So far we have been dealing with the conditions leading to error, these conditions including the teacher's activities. Now we come to the pupils' contribution. This consists fundamentally of a liberal supply of bad mental habits, habits that are exemplified specially in the school environment. Such attitudes as carelessness, laziness, indifference, we have discounted as belonging to humanity in general, but there is a special group that belong to the school; true *Idola Scholarum*, in fact.

On the borderland between the bad tendencies of mind in ordinary life and in the school comes the bad habit of loose and unjustifiable associations. The mind lazily builds up certain flimsy combinations of ideas that have a purely superficial connection with one another. These ideas are fundamentally disparate, and the association imposed on them is entirely arbitrary. One idea in such a crazy combination suggests another, and the mind indolently brings out as a unity a combination of ideas that have no significant connection with one another. To the question: *What do you know about the Rubicon?* the indolent pupil is said to have replied: "*The Rubicon is the river Julius Cæsar swam across because he had burnt his boats behind him.*" Here we have a vague combination of various statements that the pupil had heard at various times

about Julius Cæsar—crossing the Rubicon, swimming the Tiber, and burning his boats after the landing in Britain. The pupil who explained “penal code” as “what the doctor gets paid for his patients,” was obviously working on a vague association with “panel patients,” for whom a certain payment is made by the Central Government at London. A still more casual association accounts for the pupil’s statement that “the highest mountain in Switzerland is Blanc Mange.” As a matter of fact there is a widespread belief among English people that Mont Blanc is in Switzerland instead of in France; another example of the misleading effect of crude association.

This crude association is at the bottom of a great many of the howlers that newspaper people are getting rather keen about. Unfortunately they have a tendency to improve upon the material supplied from the schools, and in this way rather damage the value of the error from the teacher’s standpoint. One has only to glance over some of these enterprising lists of howlers that appear now and again in the press to discriminate between those that are possible and those that are merely *ben trovato*. “Plato was the god of the underground,” says the newspaper. As a matter of fact, the muddling of the god of the underworld with the god of the underground has really occurred in several instances as witnessed by teachers in actual practice. But the added muddle of Plato and Pluto is almost certainly the contribution of the newspaper office. The closer we keep to the truth in reporting howlers, the more likely are we to learn

from them something to our advantage as teachers.

Sometimes an association by sound and without the corrective of sight is quite pardonable. We can hardly blame the youngster who inferred from the description "well-greaved Greeks," that these warriors had been having a rather bad time, and had just cause for lamentation. Still at the crude unreflective stage was the boy in a London school who, in answering one of the stock questions, "What are the following towns noted for?" wrote opposite Lyons the word *Tea*. No one familiar with the multiple tea-shops in London under the sign of "Lyons" will be surprised at the answer. But the association is often much more elaborate than this, though quite as far from the truth. Asked to explain the phrase, "The pipe of Hermes," an ingenious pupil asserted that what was meant was the thermometer, the argument being that Hermes was another name for Mercury, and the thermometer pipe was filled with mercury. As an afterthought and to strengthen his contention, this pupil added the note: "Hermes is sometimes written Thermes."

It is obvious that in all those cases what has happened is that the term in question raises an idea that is projected against a background different from that meant by the person who used the term. The background may be incongruous, and the error discovered at once. But it not infrequently happens that the wrong background fits in sufficiently well with the general situation to prevent any patent discrepancy arising, and the error escapes notice. There is one background, however, that is very

sensitive and rapidly rouses the attention of intelligent, and even unintelligent, pupils. This may be bluntly called "common-sense." The pupil may be a good deal at sea in the somewhat remote academic world of the teacher, but he is quite at home in the surroundings of everyday life, and is ready to detect any discrepancy between the official presentation and the background against which common-sense prompts him to project it. Moving in the thin atmosphere of more or less complete abstraction, the teacher is apt to leave out of consideration facts that are the first to claim the attention of the practically-minded pupil. It was not altogether unnatural that a new pupil in a Scotch school, fresh from England and quite innocent of any knowledge of the *Shorter Catechism*, should answer the teacher's question, "What is man's chief end?" by the quite sensible, "The end with the head on." It is not very clear what the proper answer was to the question the teacher put to her class: "When you are as old as I am, what will I be?" But there is no question about the brutal directness of the reply of the pupil—"Dead." When the Bible lesson brought out the fact that there were angels at the four corners of the earth, it was not unreasonable for the child to protest: "But, teacher, isn't the earth round?" Arithmetic is a particularly rich field for errors of this type. Supposititious prices in problems are often so far from reality as to call for vigorous protests from youngsters whose experiences clash with the conditions suggested in school problems. When asked how much salmon at twopence the pound could

be obtained for a distressing number of pounds, shillings, and pence, a boy in a Scotch village, through which ran a fishing river, remarked contemptuously: "Ye canna get ony salmon at tippence the poun'." Specialised knowledge also comes in to complicate matters. Asked: "If bananas cost five cents for two, how many would you get for twenty-five cents?" a young pupil countered by asking: "What time was it?" When further enquiries were made it turned out that the price depended a good deal on whether the purchase was made through the day or in the evening. It is an apparently very simple direct question: "If there are ten sheep and one jumps over the fence, how many will be left?" It was a shepherd's boy who introduced complications by answering correctly, "None, miss."

Obviously a great deal depends on the background against which a statement, whether in interrogative form or not, is presented; so the teacher must be careful to see that the pupil's mental scene-shifters do their work properly. At an examination of little boys for entrance to the British Navy, a youngster appeared to be entirely overcome at the oral test by the simple demand to "Name an animal that eats grass." The examiners had asked this easy one merely to give the boy time to pull himself together before the real examination began. But as no answer was forthcoming, after giving the disturbed youngster more than enough time to recover his poise, the examiner repeated the question slowly, with the sinister intimation that unless an answer was at once forthcoming the examination was over.

"Animal!" repeated the relieved boy, "I thought you said *Admiral*." These words "I thought you said" are all too familiar to the teacher, and nearly always indicate faulty presentation. Very frequently the predisposing cause may be found in the pupil's presenting the new idea against an old background. The teacher has been talking along the same lines for a little while, and then suddenly changes to a new aspect of his subject; in such a case he must not be surprised if the pupils project some of his ideas against the old background instead of the new. Pupils coming into the history class-room after an exciting game in which the decision of the umpire has given rise to much harsh criticism cannot be blamed if they project some of the teacher's remarks against a football background, and instead of *empire* read *umpire*. An elementary school pupil, when challenged for writing in an essay that a certain well-known statesman had died in poverty, justified himself by quoting from a life of the man where it was told that "finally he entered the House." Against a political background in England "the House" means the House of Commons, but against an economic background (with which this pupil was more familiar) it stands for the poorhouse. To the English boy of the poorer classes the words "the Union" call up a very different background from that raised in the mind of an American boy of the same social grade.

Sometimes a background has to be manufactured by the pupil in a more or less arbitrary way. He can make no sense of the words as he hears them, and so has to twist them about in order to read

some meaning into them. A rather conceited teacher, who did not know his business quite so well as he thought, was in the habit of introducing French words rather freely into his history lessons, a little to the distress of most of his pupils. On one occasion, at an examination, one of the pupils, ignorant of French, ventured to introduce one of this teacher's favourite expressions, which was spelled in the examination script "lazy fair." On investigation it turned out that the pupil had found that the phrase, "*laissez faire*," as pronounced by the teacher, fitted in to so many cases where *lazy fair* made sense, that she had gone the length of boldly Englishing the words.

The neglect of negative instances has been already noted under the general heading of idols of the tribe, but in school it has a special application both in science and in literature. Examples are abundant in science teaching, but the vice is rampant also in dealing with language. By suggesting a number of words beginning with *st*, and indicating something fixed, well established, reliable, we can get pupils to come to a generalisation. When we have given or elicited *steady*, *strong*, *stout*, *sturdy*, *steadfast*, *stable*, *standard*, *stamina*, we easily get the conclusion we want from the pupils. It is only when we present *stutter*, *stagger*, *stipple*, *stumble*, that we rouse the doubt that is of the very essence of enquiries of this kind.

Neglect of negative instances is only one aspect of a more general habit, the jumping to conclusions too easily, basing a generalisation on too few instances. Children will sometimes found a general-

isation on a single case, and teachers of very young children are often taken aback at a generalisation that seems to the youngsters quite reasonable. What teacher would expect, before the fact, that a child would be surprised to find ink instead of water in a vessel called an inkwell, or that eggs became no more plentiful in the home though the mother had put into the kitchen garden quite a number of egg-plants.

A confusion between the absolute and the relative is a fruitful source of error. If a list of cities in pairs be submitted to a class with the instruction to arrange them, without reference to the map, so that the first in each pair shall be east of the other—let the list be the following: Madrid and Lisbon, Moscow and Paris, Berlin and London, Edinburgh and Liverpool, Florence and Barcelona, Vienna and Stockholm—it will be found that there are far more blunders in the case of Liverpool and Edinburgh than in the case of any of the other pairs. Almost without exception the pupils will put Edinburgh to the east of Liverpool, for the reason that, Edinburgh being on the east coast of Great Britain and Liverpool being on the west coast, each of them has acquired an absolute quality, Edinburgh of easterliness and Liverpool of westerliness, and these dominate the mind that is called upon to correlate their positions. The same sort of trouble arises in connection with New York and the Andes. The city carries the label of easterliness and the mountains the label of westerliness, with a corresponding tendency to error when the two are correlated, for some parts of the Andes are east of New York. The same

sort of confusion arises when the innocent youngster is asked which is the heavier, a pound of lead or a pound of feathers? Lead carries the positive conception of heaviness and feathers the conception of lightness, with the resulting danger of error.

Rationalisation—by which it will be remembered we mean the process that takes place when the mind sets about reducing all presented material to a self-consistent whole, in which the new matter harmonises with the matter already forming part of the mental-content—is in itself a wholesome process, and one that is constantly being carried on in a useful way. It has, however, a certain element of danger in it, and frequently leads to error. It is of the very essence of our mental life that internal harmony be maintained, and rationalisation is the means adopted to reach this end. Harmony must be attained at whatever cost; so if a true rationalisation cannot be attained through the data at the disposal of the mind, then a false one is made to serve. This urgent need of internal harmony leads to all manner of unreasonable rationalisations in dealing with the ordinary affairs of life, and with the subject-matter of geography, history, economics, and even of religion. Books of children's sayings are full of examples of reading meanings into phrases and incidents that otherwise would have no meaning at all for the youngsters. Many of our most popular hymns have suffered queer distortions at the minds of little ones, who must have some sort of meaning to attach to what they sing. Often the result is quite plausible from the child's point of view. This rationalised hymn-

ology is too familiar to need illustration by quotation, and besides, some, at least, of the examples are suspect. They are too apposite, sometimes, to be attributed to unaided youth. But in school the same principle can be caught at work. Decent, industrious boys are sometimes let down badly, while honestly following orthodox lines of investigation. A boy of this type translated the Latin *pisciculus* by the word *plin*. Astonished at this, to him, novel syllable, the master exclaimed, "Plin, plin? What in the world is a plin?" The confident reply was: "A kind of fish, sir." Explanations were naturally demanded, and the boy justified himself by producing a Latin dictionary and pointing to a line which read: "*Pisciculus*, a little fish (Plin.)." The boy was ignorant of the existence of a Roman natural historian called *Plinius*, and was accordingly not aware that this name was often contracted into *Plin*. Yet it cannot be denied that the boy's interpretation of the line in the dictionary had plausibility. His mental machinery worked all right. What was lacking was knowledge.

In an American class-room the pupils were called upon to write ten sentences, each containing a word that had been explained in a lesson of the previous day. A pupil, who had been absent when the words were explained, managed to make sense of the other nine, but when the master read out *nitrates*, this pupil, in perfect good faith, wrote out: "Night rates are cheaper than day rates"—quite a skilful rationalisation. Obviously the process of rationalising is one to be encouraged, even at the expense of occasional failures. It is the road to truth, so its end

is all right, and the detours that youngsters sometimes take have at least the advantage of giving the teacher an insight into their mental processes, and of enabling him to discover errors that would have otherwise remained hidden. By talking of the Bando railway, the pupil in an American school showed up a misconception drawn from the advertisements of the Baltimore and Ohio Line—the familiar *B and O*. Surprising as some of the rationalisations are, they are usually open to explanation, when all the circumstances of the case are known; and there is no more profitable exercise for teachers than this pursuit of the basis of unexpected rationalisations. In the grammar lesson the teacher was shocked when, in answer to a question in class, a pupil explained that “syntax is what you pay for being bad.” What looked like irrelevant nonsense became clearer when the teacher remembered that the community at that time were about to vote on the various taxes to be levied, and that a great deal of propaganda was being carried on. Taxes were in the air, and the pupil’s answer was merely an application of the grammatical term to an economic context. The explanation of “Sale of Indulgences,” supplied by a pupil in an American school, was far from unintelligent, though he showed clearly that his history needed attention. It ran: “The sale of spirituous liquors and other luxuries.” To an English boy it was quite a reasonable explanation of the phrase: “The three estates of the realm”—“Windsor, Sandringham, and Balmoral.” The pupil who maintained that there was no moon seemed to have a hopeless thesis to uphold, but he called in

the teacher's authority who, it turned out, had said that the moon had no light of its own, but shone by a borrowed light. She had spoken of reflected light and had incautiously used the phrase that the moon was "only a reflection of the sun." To the child this ruled out the moon as a separate entity, and he set up his astronomical heresy. Surprised at the statement of a pupil that "inhabitants" meant "cruel bad people," the mistress made enquiries, and ran down the error to the child's familiarity with Kipling's *Jungle Stories*, in which the inhabitants of the jungle rather warranted the description.

It will have been noted that we have been keeping fairly close to our condition that the sort of errors we are to deal with are in the realm of fact where there is an agreed background against which they may be presented, in order to determine whether they really are errors or not. But we must not lose sight of the possibility that even in the realm of fact there may be danger of error arising through the influence of personal bias. In such subjects as history, economics, religion, the personal opinion of teachers and the writers of text-books has a good deal to do with determining the facts to be presented and the form in which they are set forth. The result is that facts may be so distorted that they cease to be facts in the ordinary sense in which that word is used in school. In other words, actual errors, in fact, may be brought about by bias, and to this extent bias comes within our province here.

It is often a matter of controversy how history should be taught in schools, especially the history of recent times. A compromise used to be effected

in England by stopping history teaching short of the time at which controversial elements became dangerous. For long the year 1815 was treated as the end of the safe period. Then it advanced to the death of Queen Victoria. To-day there is an increasing demand to bring the subject-matter of history up to date, even at the expense of introducing practical politics. With regard to the attitude of the teachers, various suggestions are made. Some hold that the teacher ought to be biased, and to present the matter in the way he thinks best. Only in this way, some maintain, is it possible for the teaching to be honest. Others, the majority, say that the teacher must content himself with a neutral position, and should present a purely colourless statement of the facts, without giving any indication of his own private opinion.

When all is said, the kind of error introduced into these subjects by the personal bias of the teacher is a different kind of error from that we have made the standard of this book. After all, difference of opinion is not error. It would be quite possible to teach history free of error if we agree upon what we are going to regard as error. At the present time in thousands of schools, lessons are being conducted on the understanding we have here accepted. The teacher's mental-content is assumed to be free from error, and, so far as there is agreement, after a course of instruction, between the teacher-mental-content and the pupil-mental-content, we are entitled to assume that no error has been introduced. But with the incoming of matters of opinion in literature, art, politics, and religion, there

arises a weltering mass of contradictory views. We have a lack of standard that leaves the teachers in doubt. Yet education is going on all over the world, without violent conflict over these matters. Certain subjects of such vital interest to the public—*e.g.* politics and religion—that they cannot be entrusted to unrestricted instruction, are in some cases removed from the curriculum altogether, except in such cases as find the parents, school governors, and teachers in agreement. We moderns do with these controversial questions pretty much what the mediæval schoolmen did with those religious beliefs that could not be harmonised with the teachings of the philosophy of the time. These were taken out of the regular domain of philosophy and labelled “mysteries,” and, as such, were regarded as true, but inexplicable. They fell without the range of mere human explanation.

The professional teacher is entitled to have a charter of what he is to teach. In all debatable points he must have an agreement with his public. He is a communicator of knowledge and a developer of character; but he is not a public debater nor a religious missionary. He is entitled to the benefits as well as to the restrictions implied in the Aristotelian view that the statesman is architectonic to the schoolmaster. The State is entitled to say what is to be taught in the public schools, but the schoolmaster is entitled to say *how*. No doubt we cannot have the teacher reduced to the rank of a mere knowledge-monger. He must educate as well as instruct. But his education must be carried on in agreement with the ideals of the world in which

he and his pupils live. So far as the teacher carries with him the public opinion of his country and district, all will go well. The questions here raised are really outside the range of this book. It goes without saying that the teacher as a citizen must have the same freedom of thought as any other citizen. But he must not regard it as an unfair restriction that he is not permitted to promulgate his ideas, irrespective of the opinions of his fellow-citizens. To restrict the teacher to his proper sphere is to do him no wrong. If he can keep his professional work on a high plane, if he can keep the margin of error among his pupils to the minimum within the range of the possible, he fulfils his function. His views on debatable questions are his private concern.

While all this may be true, it must not be forgotten that his bias may unwittingly lead him into certain errors in relation to facts, and to this extent the affective element must have its place among the forces leading to error, both in the case of the person who teaches and the pupils who are being taught. In the history text-books of the past there is ample proof that facts can be so presented as to convey an erroneous impression. But, also, examples are not lacking of the introduction of statements that are actually not facts, and yet are treated as such by the readers of these texts, and not improbably in many cases were regarded as facts by the authors who introduced them. To this extent bias must be included among the forces leading to error, even on the restricted definition of error that we have adopted here.

CHAPTER VIII

PTAISMOMETRY

THE teacher's two main functions with regard to errors that actually occur are first to detect, then to correct them. The vast majority of errors are only too readily discovered. They thrust themselves ostentatiously on the teacher's notice throughout the whole school day. He is kept so busy pointing them out that he has little time to look up those insidious errors that keep coyly out of the way. To the ordinary teacher sufficient for the day are the school errors thereof. But for the really finished teacher, the man or woman who seeks to regard teaching as a fine art, the body of hidden error has always an attraction. Even the plain workaday teacher who honestly does his day's duty, and yet can hardly cope with the accumulated arrears of error, needs occasionally to peer into the dark places of his pupils' mental-contents, if haply he may find there explanations of some of the more flagrant blunders that find their way into the light of day. For very often a hidden error may seriously affect the body of sound knowledge with which the teacher deals.

We have seen already that there *is* such a body of unrecognised error made up of contradictory elements that are not recognised as such, since they

are never confronted with each other in actual experience. A man may go through life mispronouncing *reinforcements* and never find himself out, though the mistake may be noticed by many of his acquaintances who know that the word is a quadrisyllable but do not think it worth while to make the correction when the man uses it as a trisyllable. Occasionally rude people do point out such errors by the unkind process of repeating the word correctly and pointedly; though fortunately there are more considerate people who find a better way of reaching the same end, a way that is worth while illustrating here. An otherwise well-educated man had the habit of pronouncing the name of an old philosopher as Plot'inus, that is, with the accent on the first syllable, and the *i* short. This went on till a friend deliberately spoke to him a good deal about another writer called *Longinus*, which he pronounced with a long and accented *i*, as ought to be done in pronouncing Plotinus. The mispronouncer learnt this indirect lesson, and for the rest of his life gave the philosopher's name its proper accentuation.

Many hidden errors are thus brought to light by the intercourse of life. We notice in the actual reactions among men and things that certain contradictions arise between what we thought to be true and what is actually found in our surroundings. In fact, we are continually revising the relations among the ideas that make up our mental-content, particularly in our earlier years. By and by we reach a sort of epistemological equilibrium where our inner world is more or less in permanent

harmony with the outer. In reaching this stage, the work of harmonising the two is shared between two forms of education, the formal and the incidental. To begin with the first, it is the work of the school so to arrange the experience of the pupils that the two worlds shall be kept in steady and close contact, and that likely misunderstandings shall be anticipated and guarded against. The professional teacher spends his time in correlating ideas in such a way as to bring about, with the minimum amount of expenditure of energy, a smooth-working correlation between the inner world of his pupils and the great outer world.

When he has done his best, however, it will be found that there are certain points at which the contacts between the two worlds have not come into the sphere of school interests. It is in this region that incidental training, what may be called by-education, finds its function. By the mere process of living, the young person is brought into contact with the outer world in a variety of ways that are outwith the school influence. We learn a great deal by the mere process of living.

But when formal education and by-education have done their best there is still left a residuum of error that remains undiscovered, a sort of epistemological surd that cannot be quite eliminated. It is the teacher's business to reduce this surd to the lowest possible dimensions. In school we cannot afford to let these sleeping dogs lie. It is our business to stir them up, and to deal faithfully with them. Instead of waiting for their chance appearance, or relying upon by-education to complete

our work, we must seek them out in their lairs, drag them into the light of common day, and set them right.

A means of detecting and measuring errors is accordingly something to be greatly desired by teachers. Amid the welter of labour-saving appliances that are at present being invented and placed upon the market, it would be highly satisfactory to find an instrument for detecting errors. We have already instruments for determining the amount of work we can do, the degree of sensation we experience, the amount of pain we can endure under certain conditions, and recently there has come along a more or less satisfactory instrument for detecting lies. An instrument for detecting errors would be as useful in school as one for detecting lies would be in a court of justice. So the urge for a new instrument, that resulted in Chapter III in the invention of a metaphorical instrument called the phrenometer, is again at work, and we want to invent an instrument for detecting errors. As before, there is no prospect of a real instrument, so we must again content ourselves with a metaphor and a name. With the aid of the Greek dictionary we can at least give a name to our supposititious instrument, though we cannot quite go the length of giving it a local habitation. We assuage our longing to some extent by adopting a name for an instrument that is not in existence, though there is a niche hungrily waiting for it.

Let us make no mistake in this matter. It is true that there exists in time and space no *ptaismometer*, but merely a floating concept of a possible instru-

ment; yet it does not follow that there is not some sort of means to aid in the detection of error. Teachers in the past have certainly not overlooked the problem, though they may not have given themselves up to the invention of a material instrument. From the very circumstances of the case the discovery of errors has always been of the very essence of teaching, so it is not to be imagined that teachers have left over to the twentieth century the invention and application of some process by which they can become aware of the miscarriages of knowledge on its way from the teacher-mental-content to the pupil-mental-content.

The simple, the natural, the time-honoured, but now discredited, method of detecting error is that of reproduction. The pupil was called upon to expose his mental-content so that the teacher might be able by mere inspection to separate the true from the false. At a time when everything had to be got up more or less by heart, it was not an unreasonable plan to make the pupil repeat what he had learned, for the teacher could thus make sure that no deviation from the correct version had occurred. The pupil told the tale as 'twas told to him, and there ended the responsibility of teacher and pupil alike. Whether the matter thus reproduced was worth while involved a very different problem. As learning by rote fell more and more into disrepute, reproduction began to take different forms, and it was held that if the pupil could recall in his own words what he had been taught, it would be proof that he had mastered it, or, if that were to assume too much, it might at least be taken to prove that

he had not allowed any error to accompany his newly acquired mass of knowledge. But even this mild assumption has no sufficient basis, for in the interstices of the new knowledge might lurk the germs of serious misunderstanding. A man has been known to talk quite intelligently about John Stuart Mill's *Subjection of Women* so long as he was allowed to follow his own argument, and yet, when his interlocutors got in a question or two, they found that he was under the impression (not having read the book) that Mill was in favour of keeping women in subordination. Mere reproducing of what has been taught is good enough so far as it goes, but it does not go nearly far enough. Within its limits it may be faultless, and yet may cover a radical blunder. A pupil on one occasion reproduced without flaw all that he had been taught about Oliver Cromwell and his Ironsides, and yet at a later stage it was discovered that this pupil believed that the *Ironsides* formed a part of the Protector's personal armour. Perfect reproduction may be accompanied by a complete missing of some essential point in the subject under discussion.

Reproduction, after all, represents only the static side. It lays before the teacher the mental content of the pupil so far as the particular part of a given subject is concerned. Certain errors are at once exposed, but it is possible for quite a number of potential errors to escape the teacher's notice. In scouting, boys are warned that the best way in which they can hide effectively is by keeping perfectly still. Motion, more readily than any other indication, leads to detection. Applying the

parallel to error-detecting, motion must be introduced into the ptaismometric process. In plain English, we must not be content with mere static reproduction. We must set the material in motion if we wish to discover whether it involves error. Instead of simply ascertaining that the pupil possesses a certain portion of the *docendum* as a mere holding, he must be put in a position in which he has to use this knowledge. The test must be one of application, and not of mere possession. Illustrations will be found in abundance in what follows. In the meantime we must insist on the general dynamic principle. It will be found to underlie a great deal of what we have to say of various well-known and long-established methods of ptaismometry.

No better illustration can be found than a method that has become very popular in the teaching of composition. The method consists in setting pupils to use certain words, instead of merely telling the teachers what the selected words mean. The old-fashioned way was to get pupils to learn long lists of "meanings" so as to be able to say them off to the teacher when called upon. But while the pupils can produce a form of words that satisfies the teacher, these words may cover a totally different idea from that they call up in the teacher's mind. Not infrequently the teacher reads into the words of the pupil a meaning that is not in the pupil's mind at all. The teacher is not unnaturally satisfied with the definition of a supplement as "that which fills up." But he is not pleased when the pupil, as the result of an invitation to make a sentence

using the word *supplement*, writes, "The janitor is the supplement of our ink-wells." So useful is this exercise that we refer to it elsewhere in these pages, but at the present moment it is desirable to deal with it on the purely ptaismometric side. It has great value, but it suggests the possibility of causing and yet hiding error on its own account, particularly in the more advanced abstract subjects. Sometimes clever pupils who are not quite clear about certain points express themselves ambiguously, using technical terms in a rather loose way, and the teacher who knows what ought to be said is sometimes led away to the extent of reading into the pupil's confused writing a clear meaning that was not there. The generous teacher sometimes says to himself, "Not very accurately put, but I think I see what the fellow means."

All this inevitably leads up to the one form of test for error that is familiar to all school people. Every practical teacher who has read so far has been thinking of the form of ptaismometry that bulks so largely in school circles. The good old-fashioned examination had nominally for its purpose to test the attainments of pupils as the result of their school or other training. Experienced teachers know that so far as the old-style examinations went, the real purpose of the examiners appeared to be something quite different. In many cases it was no unfair criticism that the aim of the examiner seemed to be to find out what the candidates did not know, and incidentally to expose as many errors as possible. Indeed these old-fashioned examination papers had the air of being drawn up by error-hunters rather

than by seekers after truth. Is it possible then to use examinations for our present purpose? Can we have an *ad hoc* examination, with the specific end of locating errors?

Examinations have been under vigorous criticism for many years now, and their various purposes have been expounded and discussed. It is generally admitted that their main function, in school at any rate, is to estimate the success of the teaching, and at the same time to form a part of that teaching. The ideal now accepted is that examinations should be taken in the pupil's stride. They are to test rather what pupils can do than what they know. There is a growing distrust of the common Chinese-cell methods, by which pupils are tested under conditions that reduce to a minimum the resources at the disposal of the examinee. The old-style examiner took it for granted that the pupils should be removed from access to any aids during the examination period. The idea seemed to be that the schools were preparing for a Crusoe-life on some desert island, and so pupils should be trained to do without all the ordinary aids of civilised life.

Examinations in science were the first to show traces of common sense. Practical examinations naturally were held in a laboratory where of necessity all manner of apparatus was within reach. To be sure, the examiners did their best at the beginning to conform to tradition by forbidding reference to any table or book of formulæ. The ideal was that the candidate should carry the data contained in such books as a part of his mental-content. Now in his after-school life, the pupil will no doubt in his

own interest acquire such facility in dealing with tables and formulæ that he can work for days at a time without referring to one of them. But in actual workaday laboratories such standard aids are at all times available.

No doubt the worker who has to make continual reference to these aids ranks as inferior to the one who dispenses with their use altogether, or almost altogether. Take the case of the typist and the dictionary. Experts in typewriting almost never need to refer to the dictionary, yet in most offices a standard dictionary is regarded as a necessary part of the equipment. Those who defend the Crusoe-system of examinations are inclined to draw encouragement from such considerations, and to ask whether, after all, it is not necessary to test what can be done without any external aids. There is no doubt that an occasional test of skill in using outside aids, and in doing without them, is entirely desirable. The trouble is that, as formerly administered, the Crusoe-examination treated a candidate as incapable because he did not happen to remember some formulæ in chemistry or physics, or one or two positions on a map. The true form of examination should be one which puts the candidate in possession of all the available means of dealing with the problem set him, and judge of his success by the skill with which he uses them. As a science examination is usually held in a laboratory, so an examination in English literature should be held in a library, with open shelves.

It is astonishing how much can be learned about a person's preparation in a particular subject by

merely setting him to deal with that subject in almost any way. A teacher of English literature found that his pupils were very badly read in the ordinary simple English classics. So he prescribed a rather wide but easy course of vacation reading. He had not the time, as he certainly had not the inclination, to undertake the calvary of marking papers that would be the inevitable consequences of an ordinary written examination on the very wide field he had asked his pupils to cover. Accordingly, he fell upon the plan of setting a series of very simple questions demanding familiarity with the works read, but not exacting memorising on the part of the pupils, or tiresome script-reading on the part of the teacher. Specimen questions that he set are: "Quote the line preceding 'Man never is but always to be blest';" "How many schoolmasters were trained along with M'Choakumchild at his training college?" "Mention the seven ages of man;" "Where did Rebecca the Jewess play the part of an interpreter of events?" "Who was the other famous Rebecca that figures in your holiday reading?" Along with these were half-finished lines to be completed, rhymes to be supplied to certain words taken from the text, replies given to certain questions asked by characters in the books read. The whole would have been a rather terrible examination for students with a weak verbal memory, but was actually an exceedingly easy one for those students who had honestly read the books, though without going through that process commonly called "studying" them. On one occasion a man went in to an examination in geometry, in the old

days, with every proposition written out and concealed in various parts of his garments. He had the complete text of Euclid—unabridged—on his person, and yet came out plucked: for the very satisfactory reason that he “could not find the place.” The same fate befell the careless candidates who thought that the literature teacher referred to above had taken leave of his senses when he informed his students that his examination was to be carried on with the candidates’ books open. In other words, each student was allowed to bring into the class-room the texts of all the books he had read. Those who had honestly read the texts found no difficulty in getting from their open books the answers to the questions set. But those who had not done the necessary reading could not find the place, and shamefacedly exposed their unpreparedness.

A still simpler mode of testing the same sort of work was applied by a teacher who got rid of all examination by the expedient of getting his pupils into his room by groups of a dozen at a time, and asking them as they sat round a table merely to talk among themselves about the books they had read. The unprepared candidates sorted themselves out with almost comic rapidity in the case of the men. With the women the scheme was not nearly so satisfactory. It turned out that the dull women who had not read the books were just as easily found out as the average men, but the clever women proved a difficult problem to the ingenious literature teacher. He was never quite sure whether they were skilfully talking round a subject of which

they were really ignorant, or were talking from knowledge. Further, if he could not find out within the first three minutes he had no chance at all afterwards, for by that time these clever ones had acquired enough information from the others to go on and talk quite intelligently on a basis of fact acquired from the remarks of their more conscientious fellows. The only hope of the testing teacher was to fall back upon a rather mean subterfuge; that is, by joining in the discussion and suggesting certain things that were not in the story or poem. It was a humiliating rôle for both teacher and pupils, but it proved an admirable ptaismometer, and was remarkably successful in detecting all manner of errors in the mental-content of the young people in relation to the works they were supposed to have read.

Quite on the lines of these methods are those used by the new psychologists who invent and use tests for mental ability. Their object, no doubt, is not to discover errors in the mental-content of those who are to be tested, but rather to find out their power of dealing with circumstances as they arise. Still the number of errors made in carrying out some exercise or problem is one of the important elements in forming an estimate of intelligence. A favourite plan is to give a set of statements in which four predicates are provided for the different subjects, the test consisting in underlining the predicate that does apply. Thus the sentence runs: "An apple grows on a shrub, a vine, a tree, a bush." All that the candidate has to do is to underline the word *tree*. This is obviously testing

by error. The greater the number of errors, the lower the mark given for intelligence. This raises a new question about error. What is its relation to intelligence? Is it reasonable to say that the more errors a person makes the lower his intelligence? It would be easy to bring forward startling examples of men of the highest intelligence whose minds were full of errors. But there is not here the contradiction that would appear at first sight. The test we have just noted depends for its value not on the number of errors, but on the general information of the person tested. It works positively rather than negatively. It is doubtless untrue that the more a man knows the more intelligent he is, but it is true as a broad generalisation that wide general knowledge is an indication of intelligence.

This generalisation does not in any way imply that there is a direct causal relation between information and intelligence. Its value depends on that logical saying, *Nota notæ est nota rei ipsius*. The mark of the mark is the mark of the thing itself. Most well-informed people are intelligent, and most intelligent people are well-informed. Accordingly, there is probably some causal relation between the two. In practical experience the test justified itself when applied to adults. In a rough and ready way it was found a very useful means of discriminating between the intelligent and the unintelligent in the huge American armies during the Great War. It is not so clear that it would prove a useful means of determining intelligence among schoolboys.

Among the effective ways of making pupils apply their knowledge in such a way as to expose latent errors, perhaps the best are those that involve drawings and diagrams. Graphic representation is often an excellent corrective of verbal description. There is an old quarrel here between novelists and the artists who illustrate novels. The writers complain that the artists do not read carefully the books they illustrate, and so make serious mistakes. The writer, for example, puts his villain into an opera hat, the artist represents him in an ordinary silk hat, which plays havoc with the plot in which an opera-hat is essential to a certain piece of trickery that figures in the story. On the other hand, artists sometimes discover errors that the author has not suspected. In one case an artist complained that if he had illustrated the hero reaching for a cigar, he would have had to represent him with an arm twenty-two feet long, as that, by the author's description, was the distance indicated between the hero's seat and the table on which the cigars were to be found. It is this sort of mistake that indicates the value of graphic work as an error-detector. There is a compulsion about the drawing that is lacking in the writing. An author may not be sure of some of his details, and accordingly make a deliberate omission of the doubtful element. The artist can do the same to some extent—the trick being technically known as *evasion*. But the artist's range of evasion is much narrower than the writer's. The novelist not being well up in lady's attire may give no hint about the kind of dress she is wearing, but the artist must put her into some dress or other.

Novelists by the hundred have put their heroes on the back of camels and elephants without showing ignorance of the habits of these animals, but a large percentage of ordinary illustrators make these quadrupeds use their legs after the pattern of a horse, which is not the way nature has arranged the matter.

In actual practice both the graphic and the verbal method of description are used in schools for composition purposes, and, incidentally, observant teachers have used them as ptaismometers. In school too, curiously enough, there is a quarrel between the teachers and the artists about the use of drawings for illustration purposes. Here the complaint of the artists is that the so-called free-drawings of children are crude, slovenly, and, above all, technically inaccurate; they sin against all the rules of the Art schools; they encourage the children to neglect "the grammar of drawing." On the technical side, no doubt, the artists have a good case, but from the point of view of general education the teachers are entitled to use this method of free-drawing, since it provides an excellent means of testing for errors. Whether they will or not, the youngsters, as soon as they put pencil to paper, show up as much of their mental content as is expressible in graphic form. Over and over again teachers get shocks at the unexpected meanings their young pupils read into information conveyed by the teacher or culled from books. One of the most frequent questions put by teachers when examining one of these unrestrained drawings is: "And what does *this* stand for?" The child is often as much

surprised at being asked as the teacher is at the explanation offered. A tendency among children that is of great use to the teacher in this connection is the desire to represent facts in their starkest form. The first principle of the child is to see that the fact is plainly represented. Young children have a habit of drawing a face in profile, but still provided with two eyes. The child knows that man has two eyes and sees that he gets them. In the same line is the deadly certainty of the number five in the matter of fingers. The rake form is the most popular, in which five fingers stand sternly out of each hand—unless in those cases where the number ten has been so firmly insisted upon that the rake form is duplicated, and we have two hands each with ten fingers. What is seen here in its crudest form is to be noted all the way up the school. In history lessons in the higher classes exercises of this kind would be very useful, but at this later stage there is a certain self-consciousness among the pupils that rather interferes with the natural use of graphic methods.

The other use of the graphic in teaching is the exercise of describing a picture. The natural demand for something to write about, the need for Locke's "sense," has driven teachers to the device of giving pupils a picture containing elements of interest to children, and calling upon them to give a written account of what they see. This naturally takes two forms, the descriptive and the narrative. To make a story out of the picture has the strongest appeal to children in general, though there are of course individual dispositions that lack the imaginative touch, and prefer the pedestrian path of

description. But both forms are useful in the way of illustrating discrepancies between the written and the graphic representation. In comparing the written story with the picture on which it is founded, the teacher can nearly always gather a rich harvest of inconsistencies. As a rule the pupils are rather quarrelsome on this subject, and are inclined to uphold the view they have taken, and not infrequently they make out rather a convincing case. The exercise is an excellent one in itself, but naturally we are interested here more in the error-revealing aspect, and a little experimenting will show the reader what a valuable ptaismometer here lies to our hand.

Obviously this graphic method in both its aspects is merely a specialised form of the organised observation of the ordinary reactions of pupils to their surroundings in school and in social life. The process of living is clearly the sphere to which we are restricted when we seek to discover how far the knowledge we have communicated to our pupils is free from error. In school we have special opportunities for directed observation, and for experiment under controlled conditions. But we must not neglect the opportunities of seeing how the thing acts in open, non-scholastic work. As we have by-education in the building up of the inner world, so we have by-experiment and by-observation outside of school.

Very often young people know things, but do not realise their connection with ordinary everyday life. Most of us in our work have noticed with satisfaction the glow of pleasure that comes into

the face of the youngster who for the first time realises that a given school-fact has a place in the actual affairs of life. For example, a large piece of india-rubber has been bought on the co-operative principle by three boys, and according to money invested, one is entitled to half of two-thirds of it. The expression $\frac{1}{2}$ of $\frac{2}{3}$ suddenly acquires a meaning that it never before had for him, and when further investigation shows that his share actually amounts to a third of the whole, he thinks there is sense as well as wonder in the fact that two-sixths really amount to one-third.

In order that such occasions shall recur with sufficient frequency, the pupil's experience must be made as broad as possible, and the teacher on his side must be always ready to note every case in which trouble arises: for of a certainty the pupil's distress is the teacher's opportunity. Intercourse is the field in which the pupil has the best opportunity to expose not so much the actual errors in his mental-content as the results of these errors. It is the teacher's duty to be ever on the outlook for the symptoms of errors, and to be keen in running them to earth.

So far in this discussion we have thrown the responsibility of error-detection entirely upon the teacher, and in the last resort he must accept this situation. But he is entitled to get whatever help he can from his pupils, particularly since any such help cannot but react in a wholesome way on the youngsters. Mr Norman MacMunn's suggestion of partnership¹ in teaching comes in very handily

¹ See his book entitled *Differentialism*.

here. It is true that he is usually concerned with making the pupils partners one with another in the ordinary work of the school, whereas we are here interested in making the pupils partners with the teachers in the discovery of errors. Certainly pupils can also help each other in the process, though the teacher has to be the organiser of the work—we had almost said, of the game. For the search for errors can be readily presented to the pupils under the guise of a hunt. Those master teachers of the past, the Jesuits, were not unmindful of the advantages of this sort of partnership, and organised their young error-hunters in a way that was very effective, though it had elements of danger in it. The masters supplied each pupil with an *æmulus* whose business it was to keep a careful eye on all the blunders made by the boy with whom he was paired. Naturally the business was reciprocal, the two *æmuli* being responsible for the discovery of each other's blunders. The motive force, as the very name suggests, was competition, each *æmulus* being an opponent rather than a partner with his pair-mate. The personal element was predominant, and the love of victory the mainspring of action. The desire to down his rival was more vigorous than the love of accuracy. Some of the worst tendencies of human nature were developed by the system. We are all too fond of fault-finding for its own sake to need the artificial encouragement of such a plan. This sort of game was one in which "playing the game," in the English schoolboy sense, is more difficult than usual. The policeman spirit does not lend itself readily to "the sporting instinct."

But none of these difficulties is insuperable. All the advantages of the *æmulus* system may be secured without involving these disadvantages. The essential point is to eliminate the personal element, so far as that is possible, and to substitute a wholesomely neutral force.

No doubt we cannot get rid entirely of the personal and competitive spirit, but we can modify its influence greatly by bringing into play other and almost equally strong youthful tendencies; we may indeed almost call them instincts. Of these, the love of collections of all sorts is prominent. Why not collect errors as others collect fossils or Roman coins? Fortunately or unfortunately each day brings such a crop of errors that there is never any difficulty in finding game for the enthusiastic young hunters. To be sure, there are certain very real difficulties to be faced, the first being the excess of material for collection. The plain common everyday errors, that occur with such regularity and in such abundance, are apt to blunt enthusiasm by their lack of anything approaching novelty. The hunt for them must be limited merely to noting them when they occur, making some contemptuous sign that calls upon their perpetrators to put them right, and passing on in search of errors that have a certain interest. In this spirit the hunt can be carried on along the lines of genuine partnership. Each error as it is discovered arouses a certain amount of interest both in itself and in the method to be adopted to set it right. The pupils form a pack, and enjoy the chase and the running of the errors to earth. Thus the attitude of the pupils

changes. They are as keen as ever to detect errors, but the interest is now in the errors themselves, and not in the triumph of finding their fellows at fault. It is no longer a gloating over errors, but a pursuit of the truth. Blunders are regarded as obstacles on the way to accuracy. The excess of zeal in fault-finding gives place to a satisfaction over every discovered error whose removal leaves clearer the path to truth.

It has to be admitted that the newer manipulation of error is not quite so ebullient as the old; there is a certain mild restraint about it that was lacking in the old emulative days. But the loss as compared with the old individualistic method is compensated by the strengthening of the collective spirit. Team-work can now be introduced where before it was impossible. In the impersonal pursuit of error the class as a whole is interested in each deviation from the truth, and the public spirit of the class makes it rather unpleasant for the individual through whom error makes its way into the class-room. In time it may be arranged that error may be treated without resentment of any sort against either error itself or the introducer of error. In the old system it was *æmulus contra æmulum*; in the newer scheme it will be *æmulus contra errorem*.

But even when we have done everything possible, and called in all the help to be had from partnership with our pupils, there will always remain a little wad of errors that we can never get at. We have seen that many errors accompany us half-way through our lives without being discovered, so there is no reason to be optimistic enough to think that we have

eliminated all the errors that harbour within our minds. The consolation is that the very fact that these errors are so hard to dislodge is a proof that they are unimportant. Nature has seen to it that any serious error brings itself to our notice in a remarkably vivid way. No doubt some of our errors on the social side are not easily discovered because of certain conventions. But these, after all, are not important in the wider sense. Still it is just such errors that demand from the teacher the greatest amount of tact and good feeling. One of the best results of a careful study in error-detection will be the gradual development of skill in discovering and dealing with errors that people are slow to admit and unwilling to correct.

CHAPTER IX

TREATMENT OF ERRORS AS THEY OCCUR IN WRITING

· COMING now to what may be called the therapeutic section of our work, we have to consider how to deal with errors as they arise in the course of ordinary school routine. It will be convenient to treat these errors under two heads: those that occur in the course of give and take in class work, and those that we find in the written work of the pupils. The first set must be dealt with on the spot, the second can be treated at more leisure. Written exercises may be dealt with more on the principle of a post-mortem, while oral work must be treated under the conditions of vivid intercourse. In many ways it is easier to deal with written errors than with those that occur in actual class-room reactions. In this we find some satisfaction, for the labour of reading and grading written work is so heavy and depressing that anything in the way of compensation is specially welcome. Since the two types of errors are so different, it is well to deal with them separately, beginning with the easier of the two. Correcting written papers is on the level of shooting sitting game, whereas the detecting and correcting of errors in oral work rises to the level of shooting birds on the wing.

When we come to deal with errors in written work we have to distinguish between two radically different species: errors of form and errors of matter. In dealing with oral work there is no doubt room for a similar classification, but in the rough and tumble of class work, the element of form subtends a much smaller angle in the mind of the teacher than it does in the case of written work. We have no time to give attention to the niceties of form while engrossed in the urgent pursuit of accuracy in dealing with the *docendum*. When, however, we are face to face with the cold manuscript embodying the results of our pupils' thoughts, we have a chance of noting the form as well as the substance. In the turmoil of interaction in classroom instruction, nothing seems to "stay put" long enough for us to examine the form in which expression is sought by the pupil. But as lawyers complacently remark, when they are able to produce a piece of documentary evidence, *Literæ scriptæ manent*. When concerned with the discovery of errors, and allowance being made for the inevitable boredom, the teacher may be as pleased as the lawyer that what is written does remain open for inspection. The evidence thus put before the teacher for his examination and criticism supplies material on both the form side and the side of matter, and teachers are inclined to emphasise the one or the other aspect according to their special interests. There arises indeed a rather remarkable cleavage here, for teachers in actual experience almost inevitably fall into two groups, those concerned mainly with form, and those

whose interests are absorbed in the subject-matter.

Putting things quite concretely, we have, on the one hand, the teachers of English, and, on the other, those who teach other subjects. The teachers of English, when they give their class an essay to write, examine the results with an eye chiefly upon the way in which the ideas are expressed. No doubt they pay a certain amount of attention to the subject-matter. Nonsense, however well expressed, will not satisfy the teacher of English. But rather trifling facts and commonplace generalisations may well pass muster, if the spelling and grammar are correct and the sentences flow smoothly. Sometimes, indeed, the teacher will provide whatever subject-matter is needed in such a way as to let the pupil's whole attention be concentrated on the form of expression. In France (and it is generally recognised that the mother tongue is better taught there than in any other part of the world), the masters who teach composition are rather fond of supplying the necessary material, and are sometimes inclined to be very indignant if any liberties be taken with the material thus supplied. They say that there must be no interference with what they call "*ma matière*." For them the subject-matter is a mere datum, something given; something not to be interfered with: the important point being how this matter is expressed.

On the other hand, the teachers of subjects other than English are apt to take just the opposite view, and to regard the subject-matter as the only thing that counts. In glancing over the written work of

their pupils, such teachers pay no attention to the form. The only errors that interest them are those in the subject that is being taught—history, botany, chemistry, economics, or what not. They say they are not concerned with faults in style, grammar, or spelling. Let the teachers of English see to that. It is true that there is a respectable number of teachers in both camps who take a wider view. Some English teachers are as much concerned with the Lockian “sense” in a composition, as they are about the method in which the sense is presented. So there are certain teachers of other subjects who feel as responsible for the expression of the sense as for the accuracy of the sense itself. Such teachers may not go the length of admitting the truth of George Sampson’s saying, “Every teacher *in* English is a teacher *of* English,” but they act in such a way as to carry out the principle involved.

No doubt, in the ultimate resort, teaching is one and indivisible. We cannot teach history without at the same time to some degree teaching the language in which we carry on our work. But naturally there is room for division of labour. The English teacher is justified in laying the stress on the language; the teacher of other subjects is equally within his rights in keeping the subject-matter in the limelight. So, in dealing with written work, each teacher is entitled to stress those errors that most concern him. Because of this, we may first of all deal with the formal side of the written papers, and treat of such matters as spelling, grammar, punctuation. It is interesting to note that the teachers of other subjects than English recognise the importance

of these matters, though they claim that it is not their business to attend to them. Some time ago, in America, the naïve proposal was made that the subject-teachers should deal with their pupils' written work entirely from the point of view of the subject, and that thereafter all the papers should be handed over to the teachers of English, so that they might be criticised from the point of view of expression. The teachers of English naturally refused to be turned into the Gibeonites of the profession, so a more recent suggestion is that a new group of teachers should be instituted, whose business it would be to do nothing else than deal with the English side of papers already marked from the standpoint of the subject-matter.

All this trouble will justify the separation of one set of written errors from the rest. These may be called errors of the dictation type, errors that are fundamentally of a mechanical character, though when we approach the subject in detail we cannot but realise that there are various degrees of the mechanical, even on the dictation plane. It is accordingly worth our while to look rather closely into this whole matter, and determine the relative importance of the different kinds of error, and their connections with one another.

We have already seen that we can classify words according to their use into the static and the dynamic. So long as we deal with words as they are found in vocabularies or in the dictionary, we treat them from the static standpoint: when we find them in actual use we class them as dynamic. The difference between mere spelling and dictation

comes in just here. Spelling is concerned with the static vocabulary, dictation with the dynamic. Dictation is spelling in action: but it is also something more. It takes spelling for granted, and uses it as a means to an end. Too frequently teachers treat dictation as merely a variant form of teaching spelling, and certainly in correcting dictation papers more blue pencil is used up in indicating misspellings than in anything else. It may be conceded that as a school exercise dictation does afford a useful means of supplying practice in spelling: but this is not its main or characteristic purpose. Indeed, it may be fairly claimed that in a dictation lesson it is legitimate to assume that the pupil is able to spell correctly all the words involved. To the practical teacher of junior forms this statement is likely to appear little better than nonsense. He is apt to think that it could not be made by anyone whom optimism had not driven mad. I have heard teachers maintain that if the pupils are able to spell all the words to be used, then a dictation lesson is a waste of time.

One cause of this difference of opinion is to be found in the use of writing as a part of a spelling lesson. If a list of words is prescribed for a spelling lesson, and if the result is tested by making the pupils write down these words listwise to the teacher's dictation, we have a spelling lesson pure and simple. It is not dictation in the true sense.

When we come to genuine dictation we may be said to have three stages. In the first we have the prescription of a certain number of lines of print to be prepared in detail by the pupil. The spelling

of every word is to be mastered, so that next day, when a portion of the prescribed passage is dictated, it might seem as if we were having nothing more than the spelling lesson of which we have just spoken. But the exercise is genuine dictation, though it must be admitted that it is dictation on the lowest plane. It is marked off from the spelling lesson by the fact that all the words are used in connection with one another, and not as isolated units. Mistakes may occur among the little words as well as among the big ones. Words that the pupil can spell all right by themselves, often appear incorrectly spelled in such an exercise. It is a matter of spelling to write correctly t-h-e-i-r and t-h-e-r-e; it is a matter of dictation to know which of these spellings to select in a given passage.

The second stage of dictation is that at which a passage is selected from some book with which the pupils are familiar, though no part of it has been specifically prescribed for a dictation test. If a pupil has carefully studied the contents of a history or a literature text-book, and a dictation exercise is taken from it, we have an example of this grade of work. The pupil has had actual contact with the passage set; he knows in general terms what it is all about, though he has not made a special study of it from the standpoint of dictation.

The third and final stage is that at which a passage is given that has never been seen by the pupil, but that deals with matter that is intelligible to him, and includes no words that do not belong to his reading vocabulary. Some teachers claim the right to introduce entirely new words into a dictation

exercise, in order to provide practice in what they call "spelling words by sound." The sort of stage direction they give to their pupils runs: "If you don't know some of the words in this passage, you must listen very carefully and spell them by the sound." But this is bad, for two reasons. The first is the flagrant lawlessness of English spelling; the second is that unless the pupil knows all the words used, he cannot be sure of the meaning of the passage as a whole, and the main purpose of dictation is to train pupils in the proper writing down of a meaning that they clearly appreciate.

Psychologically, dictation is in its essence a process of interpretation. The pupil has to make a double transition: (i) from spoken sounds to mentally reproduced words; (ii) from the words thus produced in the mind to write symbols representing them. Obviously *meaning* is the keynote to the whole. We cannot make a step towards writing down what we hear, till we have made up our minds what it is about. Inferior pupils, it is true, often write dictation in a hand-to-mouth fashion, and set down groups of words to the best of their ability as they are read out, without any clue to the general meaning of the passage that is being dictated. But this proceeding is a plain acknowledgment of failure. The universal practice of reading over the whole passage with proper expression, before the dictation begins (and in many cases again after it is ended), is a clear recognition of the primary place of meaning.

It is true that mere sense perception has a great deal to do with accurate dictation work. We have already noted the distinction between visuals and

audiles. Now oral spelling is supposed to appeal specially to the audiles, and written spelling to the visuals. But in the dictation lesson each of the two has his element of advantage. The audiles score at the stage of listening, while the complete passage is read over: the visuals get their innings at the writing-down stage. On the whole, however, so far as dictation is concerned, as opposed to mere spelling, the audiles have rather the advantage, for they are better able to disentangle the spoken sounds, and therefore to get at the *meaning*, which we have seen is always the crux of the problem of dictation.

The words on the printed page are patently separated from one another, but in speech they flow into one another in the most disconcerting way. When pupils are first introduced to French-speaking or French oral-reading, they are often greatly surprised at the *liaison*, and think it just like those queer French people to run their words into one another in that curious way. Very often they do not in the least realise that English is not guiltless in this matter. There are certain circumstances under which in speaking or reading English we must not on any account drop our *itches*: but there are certain others where to retain them would be stark pedantry. "He went to 'is office" is the way an educated Englishman expresses himself. It does not matter in the least that the educated Englishman generally denies this with some heat. The important point is not what he should say, or what he thinks he says, but what he actually does say. Coleridge's old clothesman, when reproved for saying "old clo'," explained justly enough that

he could say "old clothes" as well as anyone, but if Coleridge, or anybody else, had to utter the words twenty thousand times a day, there would be a strong tendency to adopt the short-cut "old clo'." We all know the right, but follow the easier wrong. The following hieroglyphics represent not unfairly what comes from the lips of a reasonable being when making a commonplace statement: "Huh raun tadded uhrac countsup." A different impression is made when we see it written out: "Her aunt added her accounts up." Psychologists sometimes make the experiment of expressing certain sounds by unusual combinations of letters in such a way as to convey in an awkward, but still intelligible way a meaning to a listener that quite escapes the reader who stumbles through reading aloud the passage set him. Take, for example, the following. How many could make out the meaning when reading it aloud for the first time?

Ob lythe Newcombe ereye ave herd,
 Aihere thee, Andrey Joyce.
 Oak oo coo shalake allthe burd,
 Orb uttawaun dringvoyce?

Yet a listener who hears the stumbling sounds uttered by the bewildered reader has little difficulty in recognising Wordsworth's familiar lines:

O blythe newcomer! I have heard,
 I hear thee, and rejoice.
 O cuckoo, shall I call thee bird,
 Or but a wandering voice?

A little exercise in reading nonsense of this sort might not be a bad preparation for a teacher who

is likely to have a good deal of dictation reading to do.

The point acquires a certain importance too in the teaching of the sounds of a foreign language. Teachers have often a considerable difficulty in getting pupils to avoid giving to foreign words the sounds suggested by English spelling. In French, for example, mistakes in pronunciation frequently occur through the natural tendency of English pupils to pronounce the silent *e*. The English pupil is rather fond of sounding *cela* as *sella*. So teachers with large classes, who must depend on getting at the pronunciation collectively, sometimes write such a word on the blackboard as *slammetigall*, and then break the news to the pupils that it represents what a Frenchman says (approximately) when he utters the words "Cela m'est égal." People sometimes use words the detailed meaning of which they do not know, but the combined sounds of which produce a certain desired effect on the hearers. During the Great War a sergeant who was driving me in a car behind the lines explained that the non-commissioned officers had to do all the French talking, as the "Orf'cers" didn't know the language. He gave many examples of his working French, but the one that struck me most was a phrase the meaning of which he did not profess to understand, but the effect of which he said was almost magical. When a French person was unwilling to do something the sergeant wanted, that non-com. found a very effective magic in the words "Silly goor." It takes a little puzzling out to discover in this phrase the familiar "C'est la guerre." But in

describing this incident I find it much more effective to write down the words "Silly goor," than merely to utter them. When spoken, the words do suggest in a far-off way the actual French words, whereas, when they are written, they not only do not suggest the French sounds, but they throw the reader off his guard by introducing the disconcerting English word *silly*, with its misleading meaning. All of which has an obvious bearing on the prophylactic side.

Applying these considerations to the matter of school dictation, we have to realise that the first step in this exercise from the pupil's standpoint is an exercise in listening. He has to indicate in one set of units a number of sounds represented in another set. This is much more difficult than is generally recognised, and the trouble is to be met by familiarising the pupil with the language in which he has to do dictation. When he first went to France a friend of mine, who had an excellent knowledge of printed French, found that he was at the beginning greatly puzzled by a word that the people used constantly, but that he did not remember ever having seen in print. It turned out to be not a word but a phrase, *à peu près*, with which he was on excellent terms as it appeared in black and white. A similar, if more reprehensible, blunder was at the bottom of the Scotch schoolboy's whisper to his neighbour at a school examination at which the writing out of "The Lord's Prayer" was one of the tests. His whispered appeal was, "How d'ye spell toodem"? He got no reply from his bewildered companion, but when the examination

was over it came out that the inquirer in his oral repetition of the prayer had always rendered one of the petitions, "Lead us not in toodem tation." It was a case of pure and careless ignorance, exemplifying a form of that unjustifiable rationalisation of which we have already had so many examples. "Toodem" was for him a particular kind of "tation," though he had no idea of what any kind of "tation" was.

Nowhere is the correction of errors of more importance to the pupil or more instructive for the teacher than in the case of dictation. It has to be admitted that we find by far the greatest number of errors in mere spelling: but if one had time to analyse all these, a good deal of light could be thrown upon the psychological conditions under which individual pupils are working. But the errors that occur in dictation proper lend themselves more good-naturedly to our inquiries, and are on the whole more significant and enlightening. For our purpose it will be convenient to consider the errors under three heads: *graphic*, *phonetic*, and *psychic*.

Graphic errors are those concerned with the mere formation of the written words. They do not usually imply ignorance of spelling, but rather the distraction of attention, and the getting out of gear of certain automatisms already acquired. A sentence, for example, will begin with *Ii* instead of *In*, *hwo* will take the place of *who*, *surpress* will oust *suppress*. Distraction of attention may arise from many causes, most of which are rightly regarded by the teacher as blameworthy. But there is one cause that is very frequently present, and has to be treated in

a different way from the others, since the teacher must to some extent share in the responsibility for its production: this is fatigue.

We have already seen that so close is the connection between fatigue and mechanical error that experimental psychologists used to employ exercises in simple dictation as a means of estimating the amount of fatigue produced in various kinds of mental work. It is now in place to pass from the purely quantitative aspect of the errors produced in such experiments, and look into the qualitative aspect of the errors themselves. We find that the mistakes occurring through pure fatigue are almost entirely of the kind that could be avoided if full attention were available. The passages were chosen on the basis that they involved no difficulty in actual spelling, and no great strain in getting the meaning as the passage was read aloud. Even so, however, a certain small percentage of errors might be attributed to lack of knowledge or failure to catch the meaning. Ordinary experience supplies abundant material for estimating the sort of errors in dictation that may be fairly set down to fatigue. *Too* becomes *to*, or less commonly, vice versa. *They* becomes *the*: *faithful* stops short when it ought to run to *faithfully*: *sincerely* has to do without its second *e*. We cannot depend, however, on the fatigued person always adopting the shorter form. He may reverse the usual process and give *they* for *the*. Psychologists tell us that tired persons show their state by a preference for long words—explained usually by a desire for something on which they can dwell for a little. The same influence is no doubt present in

written errors. Fatigue has a slightly disorganising effect which may in fact work in a variety of different ways. If you get a letter from a friend in which *there* appears where *their* ought to, or even if the unpardonable r-e-c-i-e-v-e occurs, you will probably be right as well as generous, in assuming that it was a tired person who wrote.

We have already referred to the automatisms that dominate spelling. It is sometimes said, though the remark must not be taken too literally, that we learn spelling with the upper brain, and practise spelling in ordinary life with the lower brain. This suggests that the acquiring of accurate spelling is a deliberate process, and the use of correct spelling a more or less unwitting one. Consciousness forms in fact a source of danger in spelling. This is recognised in the very common method adopted to decide between two different ways of spelling a word. When in doubt we almost instinctively make an appeal to the actual writing of the word: we set down on paper, as quickly as we can, the alternative forms, and decide rapidly which of the two we prefer. We realise that we must decide at the moment, for reflection is fatal. We appeal, in fact, from the conscious to the unconscious.

A very common form of graphic error is the omission of a duplicated element. *Remember* tends to become *rember*, *maintaining* becomes *mainting*. There is, however, the counter tendency to uncalled-for duplication. It is not uncommon for a fatigued person to write *remember*, *difficulties*, *localalities*, *concencontration*. Words that have a somewhat monotonous form, like *monotonous* itself, or such

words as *immanent* and *imminent* are apt to be docked of some of the necessary turns of the pen. Not infrequently *-ing* becomes *-iig*. In such a word as *Egypt* there is a tendency to omit the *y*, because of the unusual number of strokes below the line in such a small word. It is worth noting that there is a stronger tendency towards graphic errors at the end of words than at the beginning. The explanation is probably that when a word has been begun, the responsibility of finishing it is thrown upon the lower brain, and in automatic actions there is a strong bias towards the line of least resistance. Accordingly, words tend to attach to themselves certain common terminations where these are not quite in place. For example, *observance* may appear as *observation*, merely because the termination *-ation* is more familiar to the writer than the termination *-ance*. So the uncommon *familial* may easily take the more common form of *familiar*. This tendency to follow accustomed paths in ending words is specially marked in typewriting. The termination *ing* is so frequently used that the expert typist has practically reduced the three letters to one connected movement, so that when *think* has to be produced, there is a strong tendency to produce *thing*, since the letters *i-n* almost irresistibly demand the concluding *g*. *Within* frequently appears in careless typewriting as *withing*.

Coming now to phonetic errors, we leave the region of the lower brain and enter the realms of the upper. To be sure, in a certain sense, consciousness in some degree or other is involved in all dictation, but graphic errors are made on the automatic plane,

and do not involve an appeal to the consciousness at all, though consciousness is involved in the very process of writing as a whole. The characteristic mark of the phonetic error is that it is connected with the ear, while the graphic is connected with the eye and the muscular sense. But the conscious element is to some extent involved in phonetic errors, though it is not prominent. It is quite possible for the pupil to understand perfectly the meaning of what he writes, and yet make hideous phonetic errors. The pupil may have a real first-hand knowledge of the two things that he nevertheless writes down as *porkmanty*, and *sangwich*, and he may know how to find his way to an office in London that he represents by the spelling *Admirality*. Mistakes of this kind often result from bad listening. In dictation it is not that the teacher mispronounces the words, but that the pupil modifies what he hears in such a way as to suit his own idiosyncrasies. He determines what he hears in terms of his own anticipations. He hears what he expects to hear. No teacher in a dictation lesson would pronounce the word as *actrocious*, but if the pupil has himself been in the habit of sounding the word in that way, the superfluous *c* will duly appear in his dictation paper. It is a case of what the psychologists call pre-perception. We have noticed already the same tendency in the ordinary answering of questions.

It is worth noting, however, that there are now and again traces that the teacher's own pronunciation is not all that it should be. A boy who spells *favver* when he means *father*, and *quanity* when he

means *quantity*, or *soluable* when he means *soluble*, is certainly following his own way of saying the word, and the teacher is without sin. But when an ordinary boy writes *Indyar* instead of *India*, or *idear* instead of *idea*, there is room for suspicion. In one case of a school examination the persistent appearance of the anomalous word *watha* in the children's dictation led to an inquiry that disclosed a local examiner who had a congenital difficulty in pronouncing his R's.

In practice it will be found impossible to separate sharply between purely phonetic errors and those that involve the *psychic* element, the element of meaning. To be sure, there are cases where the mere sound dominates everything. "What is this?" the teacher of an infants' class asks as she holds up an object. "A negg," reply the children. "And what is this?" asks the teacher, with doubtful grammar, as she holds up two objects. The ingenuous youngsters fall into the phonetic trap and reply, "two neggs." Certain problems were known in an American school as *Gazintas*, being a phonetic rendering of "goes into." *Tootums* is a purely phonetic representation of the "two times" line in the multiplication table without any admixture of variation of meaning. The *abitselfa* was the popular name in old English schools for an Infants' Manual named "A by itself A" from its first sentence. The pupil who wrote *incite* when the meaning of the dictation passage demanded *insight* made a purely phonetic blunder. Obviously she attached no meaning to the passage read. But when another pupil wrote, "Thank God we are all up to mischief,"

when the teacher had read the final three words as "optimistic," the psychic element has entered. The pupil attached no meaning to the big word, whereas the three little ones were very much at home in her mind. "Palsy is a kind of writer's dance" is not quite accurate, but it has a meaning, though the wrong one. The change is phonetic in so far as the pupil probably recollected inaccurately the sounds of *St Vitus'* dance, which conveyed no meaning to her, and psychic since she found some sort of meaning in her version. A more advanced pupil wrote in his essay, "No one has yet succeeded in edifying the dark lady of the sonnets." Again the error is composite. The boy probably did not know what the problem of the sonnet was, but his ear brought to him *edify*, and his knowledge of that word was sufficient to assure him that it had *some* meaning, and with that he was content. The boy who wrote about "loose and patriotic sentences," merely showed that the term *periodic* did not belong to his vocabulary. He made sense. There are sentences that fit into his description.

In connection with the exercise to which we have frequently referred, to write out a sentence containing a given word, we find that an error occurs quite frequently in the poorer class of American elementary schools that does not occur in the corresponding English schools, and is due, I suppose, to the negro connections. The prefix *de* in such words as *detail*, *defeat*, *delight* is treated as the definite article, and the youngsters will give such an example of the use of *Defeat* as "Soap and water are good for de feet."

But while the phonetic elements have a very close

connection with the psychic, they are not always present in errors that arise from a misunderstanding of the meaning. In any case the psychic errors are the most interesting of all, for here we find in active operation the law of internal harmony. The pupil very often does not understand the words that are presented to him, but he knows that he must make some sort of sense, and does his best accordingly. As a rule, in an ordinary piece of dictation, there is no difficulty in getting at the general sense or at the details included. But if trouble does arise and the pupil finds himself at sea, he usually makes a fairly good attempt at reducing the whole to something intelligible. Anyone above the intellectual standing of a moron, at least rises to the level of the need of some sort of horse sense, and many pupils show considerable ingenuity in meeting the demand for meaning. In one case, for example, a passage was given including a reference to the disease known as "the King's evil." The pupil happened never to have heard of this particular complaint, so was unable to make out the sense the passage really conveyed. But as he could not write down rank nonsense he translated what he had heard into the words "king Zeevil." It is true he had never before heard of this monarch, but he no doubt reflected that there must be many a king whose name he had never come across, and thus he, temporarily at least, satisfied the law of internal harmony, and was at peace.

In the above case the rationalisation was easy, because there was no contradiction involved. It was merely a matter of making up a whole that would

be self-consistent and include all the essential elements. This is the common case of those who are set to translate a passage from a foreign language. All the data are given, and by the use of the dictionary they may all be reduced to English equivalents. Yet when this has been done there often remains a body of elements that cannot be put together in any reasonable way. The pupil has the Latin dictionary authority that *sub* means *under* and that *judex* means *a judge*. He knows, further, that *sub* governs the ablative. So it is not altogether unnatural for him to explain the phrase *sub judice* as "the seat that the judge sits on." The trouble, of course, is increased when, according to our Crusoe plan of examination, the pupil is denied the use of a dictionary. *Honi soit qui mal y pense* puzzled the candidate, who, however, did his best with the rendering: *He may be honest who thinks badly*—again a not discreditable way of putting together the data submitted. Brought up short by the unintelligible *Post equitem sedet atra cura*, a young candidate, more familiar with the stable than the study, gave the rendering: *After riding he sat down with care*. So excellent is this rendering that we are inclined to think it must have been supplied by some master as familiar with the saddle as with the desk. For where we have to depend on a recorded error, without a guarantee of its genuineness, it is as well to be suspicious.

This more or less successful rationalisation goes on in schools much more steadily than some teachers realise. In many cases it satisfies the pupil, and in default of any exposure it serves its purpose, and

for the time being nobody is a penny the worse. This easy solving of problems is going on throughout most class hours, and it is only in cases when it goes wrong that it comes into the light of day, and further investigation becomes inevitable. But even when disaster follows, the incident has its helpful side, for the teacher gets an insight into mental process and some practice in throwing light into unsuspected dark places.

So long as the rationalisation satisfies the pupil by making sense for him, he can retain his self-respect, for everything goes well, even though pupil-sense and teacher-sense do not coincide. On one occasion a dictation lesson included a letter from a farm steward to his master, pointing out the bad way in which a certain farm was being worked, and saying that unless a change in the management were forthwith made it would be impossible to make it pay. The exact words used were "impossible to make ends meet." Never having heard this idiom before, the unfortunate pupil rendered it "impossible to make hen's meat." Incorrect as were these words they not only made sense, but the very sense that the dictator had intended. It is seldom, indeed, that an error of this kind is wrong in form without being wrong in matter. In a *composition* lesson it would have passed unnoticed. It was only technically an error. It is in cases like this that the teacher longs for a ptaismometer.

The determining of the exact meaning to be attached to certain keywords in the dictation lesson is usually a matter of rationalisation. The effort is nearly always successful, since there are so many

converging associations all leading to the true meaning, and each supporting the true rationalisation and discrediting any other. Homonyms usually cause but little trouble. It is difficult to confound *r-a-i-n* with *r-e-i-g-n* when found in a continuous passage. Ingenious teachers sometimes use punning quotations from Tom Hood and others as dictation tests: but at the best this is a dangerous practice, and should be very sparingly used. It is when uncommon words are used in common connections that there is real danger of confusion. "Sitting in the scorner's chair" calls up no meaning to the pupil who is unacquainted with the Biblical reference, so it is not unnatural that he should write down "corner chair," for that conveys some meaning to him. The plural of our new word *taxi* is responsible for a good deal of confusion, because of the resemblance of its plural to the familiar *taxes*. Teachers have amusing tales to tell of anachronisms arising from this cause in Biblical references.

Among psychic errors are to be included those that involve changes in the actual words dictated. The pupil sometimes absorbs so thoroughly the spirit of what he hears that he makes it his own, and is inclined to express it in his own way. He becomes so much interested in the subject-matter that he takes liberties with the text. This perfectly natural tendency must be restrained; for, after all, a dictation lesson is not a lesson in composition. Indeed, this free and easy treatment of words is comparable with that licence that is allowed in free composition in a foreign language, as compared with the restraint involved in accurate translation of a set text into the

foreign medium. Many teachers make the mistake of taking a lenient view of the manipulation of the text in a dictation lesson, and indeed look upon it with some sort of favour, since it exemplifies a spirit of independence all too rare in other connections. But care must be exercised in discriminating between different developments of this free choice. If instead of "the prince replied" we get "the prince answered," there is probably no harm done, though some slight suspicion might be aroused if the transposition had been the other way round, for, on the whole, *answered* is a more difficult word to spell than *replied*. If for "the prince received" we are offered "the prince accepted," we may have reasonable doubts about the accidental origin of the change. Anything that suggests the substitution of an easily spelled word for a difficult one should be treated with circumspection. Indeed, all things considered, it is better to stick rigidly to the ideal of the dictation lesson, which is strict adherence to the very words uttered.

True dictation must not be regarded as a mere mechanical exercise like the learning of spelling as such. Especially on its phonetic and psychic sides it opens up valuable lines of investigation, and gives the teacher innumerable opportunities of looking at things from the pupil's point of view, and thus removing misunderstandings. Every error in dictation has a cause, and points a moral. Graphic errors supply a sensitive test of physical fitness and mental control. Phonetic errors have their lessons, both with regard to the pupil's enunciation and the teacher's. Psychic errors provide one of

the very best means of bridging that great gulf that is fixed between the mature and experienced adult on the one hand, and the raw youngster on the other.

It is in dealing with errors that occur in dictation that we have the best illustration of the figure we have used of shooting at sitting game. No doubt all written work may be classed as including a large element of this static type, though as we move up towards really original composition we reach a region in which we may fairly be said to be shooting birds on the wing. A great many of the errors that wear down our blue pencils, when we are reading our pupils' written work of all kinds, may be ranked as of the *dictation type*. In dealing with them, all that is usually necessary is to indicate by a coloured mark that something is wrong: the correction may be left to the pupil. But there are many other errors that cannot be so summarily treated. The pupil has all the responsibility involved in freedom. Since he is free to choose his own words and use his own constructions he has an infinitely wider range of error than falls to the lot of the dictation writer. All the ordinary rules of grammar must be observed, and any breaches can be dealt with on the purely mechanical plane. The pupil may be reasonably assumed to have no need for any explanation of a mark indicating a mistake in syntax. But when it comes to using the wrong word, using too many words, marshalling words in the wrong order, something is needed in addition to a mark indicating error. Many teachers adopt a more or less elaborate code of signals, each of which points definitely to a particular type of error, and the correction in that

case may be left to the pupil. This plan naturally presupposes a preliminary training in the classification of errors, and a standardising of the mode of treating them. But the thing can be done, and is being done effectively. The very fact of the need for classification is one of the most valuable lessons the youngsters can learn. When the preparatory training of this kind has been given, the pupil is not only in a position to correct intelligently the errors into which he may fall, but his tendency to fall into error is considerably reduced.

But when all possible preliminary preparations have been made, there will always remain the irreducible surd of error that cannot be allocated to any pigeon-hole of classification, and must be dealt with by a personal contact with the pupil. This indeed is not to be regretted; the teacher does well to economise his time as much as possible by organising his treatment of classifiable errors and throwing the responsibility for their correction upon the pupils. But he does this mainly in order to leave himself freedom to deal with those errors that rise above the classifiable level. Those errors that need personal attention from the teacher form the growing point of the instructional process. It is here that teacher and pupil get into closest touch, and so react upon each other that fresh developments take place in the way of the communication and organisation of ideas. The general question of literary style, for example, comes under this category. Here we can lay down only the most general of rules, so general, indeed, that many people regard them as practically useless. Yet

those general rules when exemplified by the written work of the pupil may acquire quite a dynamic power. A rule that can be exemplified by reference to a breach of it in a piece of newly written composition of the pupil, acquires a concreteness and an authority that it can acquire in no other way, so far as that pupil is concerned.

In this work of general criticism we get past the stage of what may be officially known as errors. A composition may be technically accurate, and offer no resting place for the blue pencil, and yet be faulty. It may be verbose, and yet may defy the blue pencil to select individual words that are superfluous. The constructions may be all grammatically justifiable, and yet the general effect may be one of awkwardness. The meaning may be obscure, and yet it may be impossible to strike one's finger on any particular spot and say this sentence has no meaning. A composition may lack vivacity and defy the teacher-critic to analyse this lack. In short, in this higher region we must depend upon the pupil to make his own corrections so far as correction is possible. Some of the evil tendencies may be combated; others cannot be directly treated. Verbosity can be reduced by giving the pupil a series of compositions limited to a certain fixed number of words, and yet including a certain amount of prescribed matter. If the pupil is called upon to include as much as he can about Magna Charta in a composition of five hundred words, the merit to be decided by the amount of important information he can communicate within these limits, he will be greatly helped in getting a true estimate of

the amount of work different kinds of words can do. The need for a merciless excision of words that can be done without will be forced upon him by the circumstances of the case. In actual experience it has been found that this disagreeable defect of over-wordiness can be quite removed by persistent practice of this kind.

Some qualities of literary composition, on the other hand, cannot be imparted by any such direct means. The nature of the individual makes it impossible for him to acquire certain qualities, not necessarily of a high grade, but certainly of a distinctive kind. In the last resort a pupil's literary style, such as it is, must be his own. The attempt to superimpose other people's styles, the teacher's for example, always results in failure. Up to the classification-limit of errors, the teaching can be as positive as we please. But, in the region above that, all that the teacher can do is to talk over the matter with the pupil in the light of the pupil's written work actually before them at the time, and leave the pupil's own intelligence to respond as best it can in its own way.

In the last resort, a piece of composition will inevitably give away to an intelligent reader a great deal of the character and attainments of the writer. Naturally, the longer the composition the better the chance of the reader coming to a just conclusion. A novelist, for example, necessarily gives away a great deal more of his character than he suspects, when he publishes a long novel. No doubt the subject-matter of the novel may be quite different from the surroundings in which the writer lives,

but in his very selection of the events and scenes he describes, the author gives data for revelation of himself. Naturally he is not to be held responsible for the opinions expressed by his characters, but the intelligent reader draws his own conclusions from the way in which the various characters are presented, and the varying degrees of success each attains in the interplay of motives that forms the novelist's real subject-matter.

Does the same consideration apply to the case of the subject-matter of a pupil's composition? Can we learn anything about his character from the mistakes he makes, whether in subject-matter or in form? The psycho-analyst is on hand at once with his theories about how clearly mistakes of all kinds indicate the nature of the mental-content of the persons who make them.¹ From the limitations we have set for ourselves in this book, we do not feel called upon to enter into details of the psycho-analytical method of acquiring knowledge from the mental and emotional reactions involved in certain lines of social conduct. It is enough for us to realise that every error uttered in class or set down on school paper is the result of certain reactions based upon a mental-content that has in certain respects been disorganised, so as to produce results that are out of harmony with the mental-content of the teacher.

The problem accordingly arises of how we are to deal with errors in subject-matter. Here again there are two groups of error, the mechanical and the rational. To the first group belong those

¹ See in particular Freud's *Zur Psychopathologie des Alltagslebens*.

errors that result from carelessness, indifference, slovenliness—errors that are not real errors at all, but merely lapses from accuracy, often through physical causes. “Slip” is the name usually given to these fallings-away from the right path. They are often called apologetically “mere slips”: but some teachers resent this palliation to such an extent that they are inclined to regard them as errors of special heinousness. Human nature being what it is, we must be prepared for a considerable residuum of this type of error. We have noted already that fatigue is a common cause of them. We need waste no more time in lamenting their occurrence, but concentrate on how to deal with them. Obviously no time need be spent in showing that they are errors. That may be taken for granted. The moment they are noted they are recognised as errors, and their correction is a mere matter of routine. Some teachers find satisfaction in causing the culprit to suffer for his carelessness by making him write out the correct form a certain unmerciful number of times. But our aim is not vengeance: it is correction and the lessening of the chance of recurrence. The multiple-correctors say that their plan tends to discourage repetitions of errors. There is probably something in their claim, but the better method is not to be vindictive, but to encourage such a sensitiveness to error as will cause each slip to bring its own punishment in the form of personal humiliation coming from within.

With errors involving false reasoning or the acceptance of unsound data, the obvious treatment is the determination of the nature of the error, and

the indication of the lines along which correction may be sought. All that has been considered in what has gone before will be found of value in dealing with individual errors as they arise. With faults in form in written compositions, teachers will do well to learn of the compositors. These have elaborated a series of conventional marks understood by the trade all over the world, and the teacher will be well advised to consult a table of these marks in an encyclopædia, select from them as many as he finds useful for his purpose, and to these add certain marks that are of special use in the sort of correction he has to do. The compositor has naturally a different kind of script to deal with from that in the sphere of the teacher. Those who write for the press are supposed to write English that is technically perfect, whereas the school pupil is on his way to this perfection. Accordingly the teacher will require a certain sign for each of the following defects: incomplete sentence; broken construction; wrong participial reference; breach of concord; awkward construction; pleonasm or tautology; verbosity; obscurity. Each teacher will naturally make his own scheme, unless the school as a whole has adopted a general scheme. The pupils will learn the signs and a great deal of red ink will be saved. The responsibility will naturally be thrown upon the pupil, who will be expected to interpret the signs and make the necessary corrections on his own account, with the permission to ask the meaning of any sign the application of which he does not understand.

This matter of making the pupils do their own

correcting is of vital importance. In the past the habit of writing-in corrections was very wasteful. The teacher spent a great deal of time in laboriously writing-in the correct version, and the pupil merely glanced at the general grade given to the exercise as a whole, and treated the red ink with contempt. The true relation between pupil and teacher with regard to the correction of written work is one of partnership. Certain vigorous teachers of a rather artistic temperament sometimes scorn to mark any papers at all, maintaining that the value of the paper consists in writing it, and that once it is written its usefulness is gone. Others who do not go quite so far, hold that all that is necessary is that the written papers should be kept for three or four months, by which time the pupil will have advanced far enough to undertake for himself the correction of his old papers. Between the laborious waste of time of the old-fashioned teachers and the sketchy treatment of their dramatic successors, there lies the intermediate plan of a partnership in which the teacher indicates where error exists and throws upon the pupil the responsibility of finding out its exact nature, and setting it right—always with the privilege of demanding the teacher's help wherever a legitimate claim for help can be set up.

CHAPTER X

TREATMENT OF ERRORS IN THE CLASS-ROOM

COMING now to the errors that occur during the rapid interaction of ideas in the class-room, we have the same twofold classification as we found in the errors embalmed in written papers. A certain large proportion of them are only technical errors, the result of the usual human weaknesses that interfere with accuracy of expression. They are at once recognised as wrong the moment the teacher calls attention to them. All that is necessary in their case as a rule is a look of surprise, a lifting of an eyebrow, or an indication with a pointer, to put the pupil in possession of the fact that he has gone off the straight, and immediately correction follows. The capable teacher has usually no trouble in dealing with this class of error.

With errors involving some degree of reasoning, the problem is more complicated. The blunt, straightforward treatment is obviously to point out the error, and call for correction. This plan is not always a bad one, but it should be limited to those cases in which the error originates in the neglect of obvious elements. Wherever it is possible for the teacher to put matters before the pupil in such a way as to secure his immediate recognition of the error, it would seem that this roundabout method

should be used. But there is a limit of time that prevents the general adoption of this plan, however excellent it may be in itself. Just as the heuristic method is admirable in principle, but yet cannot be applied in every case because of the great expenditure of time, so this method of working out the source of each individual error is not always available. It cannot be applied all along the line. Certain errors must be pointed out as they occur, as a matter of mere economy of time. Fortunately, the supply of errors is so abundant that there need be no fear that opportunity will lack in the matter of providing pupils with suitable material on which to train their ingenuity.

Errors differ considerably among themselves with regard to the educative value of discovering and correcting them. Accordingly, the teacher must make a choice of the treatment suitable to each error as it occurs. Some he will point out himself and put right on the spot. Others he will point out and co-operate with the pupils in correcting. Still others he will neither point out nor correct at the time, but will so arrange his teaching as to lead the pupils first to discover the error, and then to set about finding some means to correct it.

To the first class belong those obvious errors that only need to be pointed out to be admitted to be errors by the rest of the class, though they may need a little explanation in the case of the individual making them. A pupil who tells us that "the inflammability of the Pope was established by the Vatican decrees," obviously needs a little enlightenment, but the process of clearing up need not take

up the time of the rest of the class. When a pupil mentions that "On the 22nd of December the sun is at the cancer of capricorn," the confusion is too great to be passed over, but the exposition should take the form of explaining the truth, rather than in demonstrating the obscurity of expression. So with the puzzling statement, "The Scandinavian Peninsula is between Norway and Sweden, and is about one-third the size of both countries," there is evident need for enlightenment. Here it would probably be wise to try to get at the cause of the absurd statement, and the process would in all probability leave the class as a whole with a clearer idea than they had before of the nature of areas and boundaries.

Prominent in the second group of class-errors are those connected with arithmetic. Often all the teacher has to do is to point to one particular step in the manipulation of the data of the problem, and leave the pupil to find out what is wrong. If he cannot get at the error, the chances are that the matter is worth taking up with the whole class. But often the error is a purely individual one. If, for example, a boy is working on the assumption that twenty-two upon seven represents the ratio between the circumference and the *radius*, a mere hint is usually enough to set him upon the right track. The same thing applies all along the line, though teachers not infrequently underestimate the difficulty a pupil may experience in setting right what to adults seems an appallingly obvious error. In one case a teacher read in a newspaper of the blunder a schoolboy had made by writing, "The

knight was clad in his coat of arms." Reading this to his class of thirteen-year-old boys he was surprised to discover that the majority could see nothing wrong with the statement, and he found a quite unexpected difficulty in getting them to realise its absurdity, so strong was the affinity in their minds between "coat" and "clad." On the other hand, when this same teacher tried his class with another error, quoted in the same newspaper, in which a pupil had answered to his teacher's question, "Who wrote *A Midsummer Night's Dream*?" with the word "Adapted," no difficulty whatever occurred in getting the pupils to see the silliness of the answer. The reason for the difference in the two cases is no doubt that in the first we are dealing with terms quite outside the interests of boys of that age, whereas *adapted* belongs to their ordinary reading vocabulary. When we have a real difficulty involved, it is worth while to spend a little time in elucidating an error that from an adult's point of view is merely a comical one. The pupil, asked to distinguish between direct and indirect taxation, explained that "We have to pay direct taxes at once, the others we needn't." Such an answer is more than an error, it is a text for the intelligent teacher.

With the third group of errors there comes a new and very important problem: the postponement of the correction of errors. Teachers have a natural desire to deal with errors at sight. The very appearance of an error is a challenge that the enthusiastic teacher finds it hard to refuse. But while we cannot allow the pupils to wallow in

error, we cannot be correcting errors all the time. There is indeed a real danger that a steady attention to the correction of errors may result in an interference with the regular flow of instruction. No doubt the thoroughly efficient teacher knows how to combine the work of instruction with the work of correction, so that sometimes it is difficult to say which is positive and which negative in the teacher's work. As we noted in dealing with the taxation error above, the actual error may become itself the substantive matter of teaching. In other words, the error may become the text for positive instruction.

But when all has been said, the conscientious teacher is unwilling to pass an error uncorrected, so it is rather apologetically that we recommend the passing by of certain errors without comment at the time, in order that we may deal with them more effectively at a later stage. To reconcile teachers to this apparent slackening, we may compare their situation with that of the pupil. The old-fashioned way was to put it to the pupil that he should never pass by a difficulty that he had not mastered. The comparison was made to the position of a general entering a hostile territory; his policy, we used to be told, was never to leave an untaken fortress in the rear. So the pupil was told that he must sit down before each difficulty as the general's army does before the fortress, remaining till successful. Whatever may be the case in war, there is no doubt that the attitude of teachers is now changing with regard to postponing difficulties. It seems monstrous to say anything against the teacher's idol of *Thoroughness*. Obviously in these pages the

word *idol* is ambiguous; but its double meaning makes it here a peculiarly suitable word, for there is no doubt that the term *thoroughness* is used in a rather loose way in our school thinking. The whole point lies in the stage at which the thoroughness is tested. It may well be that the process is too thorough, so thorough that the total result may be endangered. The detailed working may be so thorough that the result itself is not thorough. The real value of a process must be determined by the final outcome of the whole.

So with the treatment of errors. The wisest plan in the long run may be to pass them by at the time they occur, but make very definite arrangements for treating them properly at the suitable time, the more convenient season. The reader may suggest that the sinister connotation of this phrase is only too appropriate, so we can only reiterate the need for precautions against allowing any error to escape ultimately. The teacher, it goes without saying, must *never* let an error entirely slip his notice, though he may on suitable occasions pass it by without overt action. Just as, in studying, a pupil must never give up a difficulty in a permanent way, but only pass it over in order that further reading and study of the subject may enable him to master it, so the teacher will only pass by an error in order to get at it in a more effective way at a later period. He may make merely a mental note of it, or he may commit his note to paper, but in any case the essential point is that a note has been made, and will be attended to at the proper time. Those errors that may be committed to a mere mental

note are those that occur so frequently that there is no chance of forgetting them. The more recondite error probably needs the aid of the written word, and when written it must be attended to at the earliest convenient moment. The treatment of errors on the postponement plan should usually imply such a process as shall lead to the pupil's discovering for himself the error of which he is guilty, and to his searching out a plan of dealing intelligently with it. For example, a boy, in answer to a question in a history class about the latitude of a certain town, gives the figure 110; the teacher is probably wise in not taking up the challenge at the time, and in contenting himself with making a note of the error, and either passing it on to his colleague who teaches geography, or taking it up himself in a future lesson dealing specifically with geography.

The compensations involved in this self-restraint in allowing errors a free run for a while are important. There is first the great gain in serenity that comes from avoiding excess of fault-finding. Then there is the gain in actual time to be devoted to the positive side of teaching. The teacher who is continually making corrections has no time for positive advance. Even when allowance is made for the use of errors as the basis of positive teaching, there is the very definite danger of marking time and not getting at anything new. We cannot teach by means of errors alone. There must be left a reasonable time for constructive teaching, and if the teaching period is cut up into snippets, all dealing with the correction of errors, there is no

chance of getting up that "swing" that is so essential to wholesome and stimulating teaching. The loss of this driving power is very serious indeed. In his report on the class work in Scotch schools, Horace Mann tells us, if my memory serves me, that the error is made and detected, the punitive blow administered, and the next boy invited to go on, before the onlooker has had time to realise what has happened. All this—except perhaps the blow, that is now out of date—is exactly as it should be. The error and its correction take their place as subordinate incidents in a process that is fundamentally positive rather than negative, and that has a swing about it. A successful class must be always pressing onward, not ridden on the curb. Unless there are clear spaces of time in which uninterrupted progress can be made, the pupils can never get a wide view of their subject as a whole.

For the comfort of the teacher whose conscience makes it hard for him to allow an error to pass uncorrected it has to be pointed out that, while from the very nature of things certain errors must be allowed to escape, for the time at any rate, many of them are of such a nature that they tend to lead to their own correction. By the mere process of interaction with other minds, the pupils contrive to get rid of certain awkwardnesses of speech, and to note that certain impressions they had formed of things are not quite justified by the experience of everyday life. The force of imitation is a powerful ally here. A pupil may use a word in a wrong sense, but, by a more or less unwitting imitation of the teacher and his cleverer class-mates, he gets into the

way of using the word with its proper meaning. There is, besides, a process of undeliberate but very effective self-correction going on. Every time that a question of some difficulty is put to the class and answered correctly, many members of the class make a mental note that the answer they would have made, had they been called upon, would have brought them anything but credit. Sometimes, indeed, the very answer they would have given is offered by an unfortunate class-mate, and the undiscovered blunderers congratulate themselves on their escape. Every time that some such untoward answer occurs in class, the chances are that several of the pupils would say, if they knew the story of the old Puritan who saw a man being led off to be hanged, "There, but for the grace of God, goes poor me."

We thus have a sort of way of escape from the horns of the dilemma. We cannot possibly correct every error that occurs in class, yet our consciences will not willingly permit us to let an error pass unnoticed. But when the nature of things works to some extent on his side, the teacher may, with a good grace, make a deliberate plan for dealing effectively with errors without having to deal with each one as it occurs. The skilful teacher does not neglect any error. He is always on the alert for them; but it does not follow that he deals with each just as it occurs. Now it has to be admitted that the moment of its emergence is precisely the best moment to tackle the error. Teachers of English composition, or of Latin prose, realise this so clearly that some of them arrange to do the

correcting of written papers as far as possible during the time when they are being written. They pass about among their pupils while these are in the act of writing, and criticise the part that has already been done. They find that attention called to errors that have just been made is much more effective than attention called to them after an interval of days. In the same way as chemical elements in their nascent state, just when they have been set free from their combination in a molecule, are more vigorous in their reactions than at other times, so the concepts that have just been caught in the act of forming false combinations are more easily worked up into true idea-clusters. Accordingly, wherever it is possible to catch a group of concepts in the very act of forming a wrong combination, that is the best time to get them changed round into the combination that we desire. We ought accordingly to be always on the look out for such favourable moments, and take advantage of them whenever they occur. This is not at all inconsistent with the advice to postpone the treatment of certain errors to a more convenient season. Different errors have to be treated in different ways. The general principle under which all sorts of errors are to be treated is that they must be organised, so far as possible, to fit into the general procedure of the class-room. When this is done, each sort of error will find its level. The mechanical type will be relegated to its proper place, and treated under moral and physical heads. Cognitive errors will be so dealt with as to come under the suitable categories, while errors that involve more

or less conscious reasoning may be kept in reserve for treatment at times when the conditions are particularly favourable.

Since the teacher, in order to avoid congestion, may wisely pass over certain errors for the time being, he is left free to deal with certain other errors that are in urgent need of treatment. This implies an organisation of errors, as suggested above. We must make a selection of those that are of most importance at the time, and deal with them on the principle of "Divide and Conquer." Dr Edward Thring heads one of the chapters in his *Theory and Practice of Education* with the whimsical title, "Run the Goose Down." Here he develops his plan of dividing up the commoner errors into groups that may be dealt with one at a time, or at any rate in little groups of cognate nature, and pegging away at them till they are eliminated. Thereafter, of course, he would make out a new list, and so on. The plan is excellent. No doubt it demands a wise selection of the particular groups to be set apart for intensive treatment. But in the particular subject in which Thring was specially interested—the classics—the tradition of teaching is so well organised that it is easier than in some of the modern subjects to make a wise choice. But in any case the individual teacher must make his own selection. Nowhere more than here is it essential for the teacher to make his own plans. After all, it is not errors in general but the particular errors of the class here and now before him that determine the teacher's plan of action. He must learn as much as he can, on general lines, of the nature and treatment of error,

but in the application to his particular case he must stand on his own feet. He must determine which errors may best be left untouched, and which demand immediate attention. His personal equation here deserves consideration. After all, he and his pupils between them make up the little world in which the struggle with error is to take place; he is the general, and is entitled to select the ground of battle. Rigidity is one of the dangers to be carefully guarded against. There must be give and take all along the line. While attention is wisely concentrated on a selected group, certain general errors must be open to the attack of the teacher at any time. Occasional "close periods" for certain errors are admissible, but there are other persistent errors that must be treated as beyond the pale, and liable to be shot at sight.

Throughout we have been assuming the co-operation of teacher and pupil. Unless this be secured there is small chance of real success in error-elimination. In our getting into touch, and in keeping in touch, with the pupils, the law of internal harmony is naturally of the first importance. We have seen that this law is always in active operation; that contradictions are continually arising in the pupil-mind and demanding some sort of reconciliation. This restoration of harmony would seem to be a matter that the pupil must work out for himself; the contradictions must be settled on the premises. Yet the teacher can help materially in the organisation of the struggle for tranquillity within the mind of the pupil. In that mind, the natural preference for the line of least resistance

makes itself manifest in two ways. First, it pre-disposes the mind to be content with things as they are, and not to inquire too daintily whether certain mental elements do or do not agree with one another. Among young people there is general approval of the spirit underlying the recommendation: Let sleeping dogs lie. The teacher, on the other hand, finds it to be his business to stir up all intellectual sleeping dogs, and to set up disturbance within the otherwise tranquil pupil-mental-content. But no sooner does the trouble arise than the second juvenile tendency makes its appearance. As the youthful mind is slow to be disturbed, so is it easily restored to equilibrium. We have seen that what is needed is *a* reconciliation. The young mind is only too glad to accept whatever resolution of the contradiction offers itself, without going out of its way to verify what is presented, so as to make sure that a real reconciliation has been secured.

In both these directions the teacher can do a great deal for the pupil. Naturally, the chief instrument in his hands for this purpose is confrontation. We have already seen this instrument in use by the teacher, but mainly against errors that have actually been made. Now we must realise that it may be also used by anticipation. Matters may be so arranged as to secure that in the mental progress of the pupils a certain contradiction will inevitably arise, with the necessary result that a troubled state of mind will follow. By leaving to the pupil the selection of the kind of reconciliation to be found in the circumstances thus led up to, we run the risk of his choosing too easy a solution

of the difficulty. But the lesson in initiative and self-reliance thus obtained is worth the risk we run—particularly as it is our business to be at hand, in any case, to see that a too easy result is at once challenged. The teacher immediately makes a new confrontation, and the pupil is once more set upon his travels in search of a reconciliation. A steady repetition of this process will be irritating, no doubt, to the harassed pupil, but it will make him all the more anxious to get a solid foundation on which he may find permanent peace. His sensitiveness to the possibilities of error will gradually develop in him a sort of error-conscience that will prevent him from being too easily satisfied with the first reconciliation that occurs to him.

Whatever encourages pupils to take stock frequently of their mental-content, in this direction and in that, helps materially in the process of maintaining internal harmony, for it results in the constant discovery of latent discords and leads to the efforts necessary to get rid of them. It is here that one of the less obvious advantages of class-examinations may be discovered. Before an examination covering the work of a session, the pupils naturally try to cover rapidly the whole ground, and just before the actual examination, they often experience a curious feeling that they are just on the brink of understanding the whole subject in a much more effective way than they did at any period throughout the course, and that if they only had another three weeks instead of three days they could really master it. The cause of this feeling is that in the process of revising they have of neces-

sity been compelled to compare one part of the work with another, and thus to gather up the threads and weave the whole into something intelligible. In this process it is inevitable that certain contradictions emerge that had remained unnoticed because of the piecemeal fashion in which the whole subject has been hitherto presented. In the wide view, the discovery of contradictions is compensated by the fact that the very conditions that exposed these contradictions supply the best means of reconciling them, for, in the wide view thus secured, the higher unities in which reconciliation is possible are brought within the pupil's purview. This review, with its inevitable exposure of latent contradictions, brings up the question of the possibility of danger through exceptionally skilful presentation. Is it possible that, through particularly effective prophylactics, matters may be so clearly brought before the pupils that there will not be sufficient practice in the dealing with errors? For it must not be forgotten that a certain amount of experience in treating errors is of the essence of the educative process. But our experience makes it evident that we can never carry prophylactics to a state of dangerous perfection. As has been indicated almost *ad nauseam* in the preceding pages, there will always be left a sufficient supply of errors to meet the educator's need, even without the aid of mistake-traps, which, as we have seen, while permissible in the hands of skilful teachers, must be limited in number.

The errors exposed by revisal work have a special value, since they bear the mark of the pupil in

question. An assortment of errors makes quite a suitable material for mental training, but there are no errors that so satisfactorily meet the case as those made by the pupil on his own premises. One is almost tempted to carry on the medical figures and treat home-made errors as having a special serum effect on the personality from which they emanate. But even when taken in the most literal sense, the mistakes a pupil makes himself supply the very best material on which to sharpen his wits on the subject involved.

One of the most fruitful sources of error arising from the pupil's own initiative is to be found in a habit roundly condemned by many teachers, the habit of *guessing*. Now this habit is not inherently bad. Indeed, we shall find that in itself it is something rather laudable. Why, then, do teachers condemn it so vigorously? Why is it so common to hear the teacher's reproachful voice proclaiming: "Now you're guessing"?

Philologists tell us that the word *guess* is connected in some remote way with the verb *get*, and originally meant trying to get something. The implication seems to be that the getting was illegitimate, the reaching of an end by an unwarrantable short cut. The dictionary suggests that guessing implies the coming to a conclusion without any basis for the judgment on which it is based, a mere haphazard performance. Sometimes the word rises to a more respectable level, and connotes success: "Whoever guesses this riddle gets a prize." In guessing a riddle we do not go about the matter haphazard. We make some sort of calculation. Even if the

problem is to guess the number of peas in a given barrel, we do not usually mention some number at random. In a case like this no doubt, we often feel as if we might almost as well guess thousands as tens of thousands, so little do we know of the probabilities. It is under circumstances like these that the teacher is justified in discouraging guessing. If the pupil might as well throw up his penny in the air and decide according as it came down head or tail, then we have a case where guessing of the illegitimate sort necessarily occurs. But it is part of the teacher's business never to allow a problem to be put in such a form that the head-or-tail formula can be applied.

Whenever a problem is so presented that there are some data on which a conclusion may be based, we have passed out of the region of mere guesswork of the objectionable kind, and have attained the region of intelligent reaching after truth. No doubt the data may be so scanty that we cannot feel at all sure of our ground, and prefer to use the word "conjectures" rather than "conclusions" when we speak of our results. We feel that the chances are all against our getting the correct solution of our problem. But so long as we reach a conclusion by the aid of the material submitted, however slight that material may be, we are working along lines that the teacher can approve.

There is a well-known book of very serious nature entitled *Guesses at Truth*. Here no charge of flippancy, frivolity, slovenliness can be admitted. Serious subjects are treated seriously; the only ambiguous point in the matter is the title of the

book. But we must not be misled by a mere word. *Hypothesis* certainly sounds much more impressive than *guess*, but it represents exactly the same sort of thing as is suggested in the title of the book in question. To make a guess and to frame an hypothesis do not necessarily mean the same thing; but they may do so. Whenever there is a doubt in the pupil's mind as he answers a question, we have a case of making an hypothesis. If the answer proves right, there is a verification of the hypothesis; if it is wrong then the pupil must make such a modification of his hypothesis as will fit it into the conditions that have prevented verification. In putting the question, the teacher had in mind certain conditions that were not in the first instance manifest to the pupil. When these have been brought to his notice his business is so to reconstruct his answer as to satisfy the conditions. For when a pupil answers amiss, the teacher who knows his business does not merely say that the answer is wrong, but brings forward some new fact that is inconsistent with the hypothesis made by the pupil. By a series of improving hypotheses, then, or guesses, if you prefer that word, the pupil gradually approaches, and finally reaches a statement that can stand criticism. His final success justifies the optimistic description of the poet who speaks of

The golden guess
That's morning star to the fair round of truth.

This process, by which the pupil is led to modify his first guess in such a way as to lead to truth, we have often met before under the name of *confronta-*

tion, the bringing into consciousness of ideas that are inconsistent with some idea or group of ideas already in the mind. It must be regarded as a normal resource of the teacher, which really implies that guessing must be admitted to be a normal process among the pupils.

The fact is that children are guessing all the time, and for that matter so are adults. The old-fashioned English phrase that became for a while so characteristic of American speech, "I guess," is a practical acknowledgment of the prevalence of the habit in ordinary life; though the parallel phrase, "I calculate," suggests itself as a better expression of what both phrases really meant. The man who calculates implies by his very word that he has some data to go upon, and the same implication underlies the "I guess." So the teacher's only justifiable objection to guessing is that it is sometimes carried on with too scant material to work upon. Teachers sometimes describe the objectionable kind of guessing as "saying anything that happens to come into the mind without thinking about it." Even this will no longer meet the case, for the newer views about the unconscious come in here, and an answer that may on the surface appear to be the result of mere chance may now be regarded as having a definite, more or less logical foundation, though not closely related to the question asked. A mere thoughtless, haphazard answer may convey to the intelligent teacher a great deal of information about the mental-content of the pupil, but this is information-by-the-way; important, no doubt, but not directly bearing upon our present point. In

the process of instruction the teacher is concerned with truth and error in matters of knowledge; the mental-content and its internal harmony are the centres of interest. The knowledge the psycho-analyst acquires by random-answering is knowledge-by-the-way so far as the instructor is concerned; the professional teacher finds nothing to his advantage here and now in the class-room from the speculations of the psycho-analyst based on thoughtless answering. The more thoughtless the answer, the more meaning it conveys to the interpreting psycho-analyst, and the less to the class-teacher.

Teachers are right in keeping a sharp eye on the guessing of their pupils however, not in order to extirpate it as some fondly think, but to direct it into the proper channels. If the pupils do not guess during a lesson, there is probably not sufficient opportunity for enterprising thinking. If the pupil can answer questions with perfect accuracy because they deal with facts that have been already impressed on his memory, we do not have thinking, but mere examination, mere reproduction of material already acquired. If the pupil can answer with perfect confidence because he is following the laws of thought as thought under the guidance of a skilful questioner, he is doing real thinking, but he is confined to a very narrow range within which the *a priori* is dominant. In the great majority of school subjects the pupil must always answer with a certain degree of diffidence, because it is seldom that he has at any stage in his school career the full knowledge necessary to answer with certainty. Most of the pupil's work, if he is to make real

advance, must be carried on in the realm of intelligent guesswork.

Often the pupil can hardly be said to guess at all, since there is apparently no need for anything but the obvious. It is a case rather of taking things for granted than of making a shot, however well warranted. There is no problem, so there is no need for making guesses, risky or otherwise.

CHAPTER XI

GENERAL SURVEY

IT is wise to take stock of the gains and losses that accompany any enterprise of some duration. In education our regular examinations used to be regarded as more or less satisfactory instruments for this purpose. But of late we are not so sure, and educational folk are getting more and more interested in the finished product, and are beginning to investigate the young people who have completed a full secondary course. Of course we must take account of the whole personality of the boy or girl of eighteen who has just left school, but, for our present purpose, we are naturally most interested in the mental-content that the finished young person shows as the result of the long course of training.

Fortunately for our purpose, French educationists are paying special attention to this aspect, and some of them have made inquiries that have produced very depressing results. The investigators have been appalled at the completeness with which the facts that have been laboriously instilled into the minds of the young people have disappeared. Perhaps the *Integralists* are more than usually interested in this matter. Their principle is that education should not be a thing of shreds and patches, a series of dabs from this instructor and

from that, with no underlying correlating force. They tell us that education consists too often of the mere application of a fragment of an educator to a fragment of a pupil—and, they might add, about a fragment of a subject. We must wish them God-speed in their striving after unification of education; but, in the meantime, we have to confine ourselves to the cognitive aspect, so we welcome their contributions to the clarification of the problem of the mental-content of the eighteen-year-old pupil who has just left school. The investigators indeed find only a sorry rump remaining. The fact is undoubtedly true, but the applications they make of this fact can hardly be called wise. M. Marcel Prévost, for example, in his ninth *Lettre à Françoise* remarks:

“Even when intelligent and industrious, the pupil can retain of all this scientific litter only an infinitely small residue, composed of disparate elements . . . is it not more logical to make up *beforehand* this residue of essential elements, well-correlated together, and to stick to that ?”

In his *Le Problème de l'Éducation*, L. Dugas quotes this passage with approval, and suggests the application of the plan to the work of the schools. Obviously there is something seriously wrong with this reasoning. To begin with, it ignores completely the difference between knowledge and skill, and all that underlies the doctrine of forgotten knowledge. The fundamental difference between ideas as presented content and as presentative activity is neglected. Even if the reader does not see his way to accept the distinction suggested in these pages between

idea and *concept*, enough difference has been shown between the two points of view from which ideas may be regarded, to justify the demand for a different treatment for each aspect.

But while we thus have a status in this discussion, even though our readers are unwilling to accept our big hypothesis, there is another approach to the subject that justifies our claim for consideration. What is left in the pupil's mind after teaching has gone on till the end of the eighteenth year may be considered from two points of view: quantitative and qualitative. It has to be admitted that quantitatively the beggarly *fatatras*, that the French investigators admit to remain as a mental-content, makes a very poor show when subjected to the yard-stick of quantity. But there remains the final test of quality. Does the residual *fatatras* deserve this opprobrious name? The French writers appear to take it for granted that what is left after the long course of study and the exacting examination is at least sound. But of this we cannot be at all sure. The pupils may have been intelligent and the teachers skilful, and yet there may be—almost certainly will be—a residuum of error. In all probability, however, the *fatatras* of error will be small, and not of great importance.

We are speaking of the products of good schools with capable teachers and high-grade pupils. In the case of other schools and pupils, there is no doubt that the final mental-content will include quite a big element of genuine errors. For the errors that make up an irreducible surd of blunderdom in the mind of the capable and well-trained

pupil are often not real errors, but just the results of slovenly existence—thought can hardly be claimed as taking any part in the process. In Chapter VIII of Part II of his *Theory and Practice of Education*, Edward Thring, once headmaster of Uppingham School, England, deals with this class of mistakes, that he says are not genuine. “Sham mistakes,” he calls them, and says that the pupils who made them were not awake at the time. Indeed, he goes the length of calling them not errors but *snore*s. Even in a well-taught school it is impossible altogether to eliminate this type of error, but no great harm will result from them, so far as the eighteen-year-old mental-content is concerned. No doubt, in a really good school the number of snore-errors will be small, and perhaps we may go the length of saying that most of them do not come from the school, but drift in from the various highways and byways of what is called real life.

This reference to out-of-school life raises the important problem of the possibility of a certain morbidity rising in connection with a more or less systematic treatment of errors in school. In our first chapter we dealt with the dangers of an unwholesome school atmosphere resulting from the fault-finding attitude, and references to these dangers have been made throughout the book. We now come to another general danger of unwholesomeness through emphasis on the error side of our work. This is no new danger in our profession, but perhaps we are more likely to fall victims now that we are deliberately taking up the problem of error.

Hitherto we have used truth as the antithesis of error, but probably we would do well to use *accuracy* as the professional opposite, and it is in the excessive regard for accuracy that there lies the danger just suggested. From one point of view we can never be too accurate, but from another we can. So long as being accurate means the avoiding of error it must be praised, but when it is made to mean a certain precision, it may be carried to excess. What is called pedantry is often really over-accuracy. Matters are put in such a precise way, each minute detail must get its full value, so that the ordinary person has no patience with the pedant. There always has been in the world a preference for clear bold statement, without too many exceptions and parentheses. If "witchcraft loveth numbers odd," plain sensible people love round numbers. Perhaps one cannot be too accurate in statement, but one can certainly be accurate in too great detail. Not only does great detail not help, it often actually hinders. The statistician who gives the final unit in every statement involving millions really confuses his hearers—in printed reports the readers can be depended upon to stop short at the significant figures. The height of Mount Everest used to exercise a certain fascination because of the final digit in 29,002 feet.

The word *accuracy* is a better one to use in connection with a teacher's excess than is pedantry. The day has gone when teachers as a body were with justice termed pedants, though we still speak of the "schoolmaster attitude." This usually implies a dictatorial pose in relation to matters of

academic knowledge, and a claim for accuracy beyond the common. Great is accuracy and the schoolmaster is her prophet, represents not unfairly the state of mind that Lamb suggests in his *Old and New Schoolmaster*, when he describes the pedagogue's good-natured offer to teach the essayist how to write English. But even if we soften the term pedantry to excessive love of accuracy, we run a certain risk in inviting teachers to specialise in error, since this may lead them into the temptation of becoming still more exacting in the matter of accuracy, and thus render them still more liable to popular criticism. This danger has not been neglected in what has gone before, since it has been pointed out that the teacher is not expected to be a specialist in error in the sense of being a virtuoso who collects and gloats over *objets d'art*. The collector of *howlers* is on the way to sin in this direction, and must be continually on his guard against it. The prophylactic treatment in this matter is to change the point of view from the æsthetic to the professional. The teacher's interest must be in the error and its cause, rather than in its artistic charm. We have admitted that the teacher is entitled to his gloat along with others, but for him it must be a side-issue. His main interest must lie elsewhere.

As a steady influence there is nothing quite so much needed at the present time in education as an objective standard. Our work is carried on so largely on the plane of mere opinion that it is very difficult to avoid at least the appearance of error in dealing with our problems. No doubt we

are approaching, but only approaching, something like an objective standard through the use of quantitative methods, and the application of brass instruments in our investigations. In the meantime we are so much exposed to controversy and widely differing opinions that readers will readily understand the need for the convention adopted in the text of limiting our range to the cognitive side, and within that adopting the further limitation to the region of the subject-matter in the sense of the *docendum*. In this way we have attained an artificial objective standard within a certain area. But no doubt the reader feels, as does the writer, that with the certainty thus introduced comes a peculiar feeling of aloofness, because of the very certainty thus secured. We feel enclosed in a little school world of our own, and excluded from the busy haunts of men. Further, we feel that after all the teacher is a human being, and must be admitted to be liable to all the ordinary human errors. In addition, throughout our whole treatment, this human element has been pressing in upon us and claiming our attention. But there has been no harm done. We have been merely studying error under something like laboratory conditions. The earlier part of the book has treated error from the more general standpoint, where we have admittedly no objective standard, and it is only when we wish to deal with the matter in a more detailed way that we venture to shut off our own little field, and set up our own tentative objective standard—the teacher's mental-content in relation to his *docendum*.

It may perhaps be charged, not altogether unfairly, that the sphere of infallibility, though limited, ascribed to the teacher in these pages may do something to confirm in him the schoolmaster attitude. The defence is that the transference of authority from the text-book to the teacher is a wholesome one. Time was, and that not so long ago, when the teacher openly accepted the text-book as the final authority on any matter of fact in the subject he was teaching. This was probably more marked in the case of elementary teachers. At any rate, teachers gradually acquired the habit of greater confidence in themselves, and even went the length of sometimes actually contradicting statements made in the text-book. Sometimes a teacher would at the beginning of the session take the occasion to make the pupils write in their new books a list of *errata*. Indeed, it was said of some teachers that they actually selected the text-book that would give them the fullest scope for this anticipatory correction. The change of the seat of authority from the text-book to the teacher's own mental-content is a good one, for it increases his personal responsibility for the accuracy of what he presents to his pupils.

A sort of compromise between the two positions was tried for a while in the form of causing each pupil to make a text-book for himself by taking full and careful notes from the teacher's lessons. The scheme had great merits since it involved initiative on the pupil's part, and encouraged him to take a definite share in the class-work, and to ask intelligent questions. It broke down on a point of vital interest

to us here—the high percentage of error. Even when the teacher made a synopsis on the black-board there were great risks of error in copying them, and an error once entered on the pupil-made text-book had small chance of correction. However imperfect a text-book may be, it is at least a sort of standard by which to check up the teacher, and supplement what he has told his class.

Turning now to the pupil who has finished his course, what are the effects that we hope to find as the result of our specialising in errors? There is no doubt that at the beginning we shall find a certain arrogant pride in accuracy as such. Young pupils are often aggressively fond of accuracy and given to argue rather acrimoniously on matters of fact. The same spirit sometimes lingers as the result of a bad education, and manifests itself in the wrangles that one hears in Pullman-car smoking-rooms. The tendency is not in itself bad, and if it could be kept to subjects that are worth while it might even be encouraged. But it too often takes the form of what is called *eristic*—that is, arguing for the sake of argument, or arguing for victory instead of for truth. What we want to cultivate in the minds of our pupils is a sane attitude towards accuracy. We cannot do better than apply the Aristotelian method here, and claim accuracy as the mean between pedantry and slovenliness. When a man tells me that there are in the entire Bible 3,566,480 words I regard him as a pedant, whereas I treat as a sloven the man who answers my question, “How many stations do we stop at between Boston and New York?” with “Quite a number.”

The Herbartians tell us that the real aim of education is to leave the mind with a many-sided interest. A not unworthy parallel to this ideal would be: a sense of accuracy. This does not imply at all a freedom from error. We may go wrong though we have a sense of accuracy, but if we have that sense we are likely to know that we have gone wrong, and at the slightest indication of error we are on the alert. It implies a sensitiveness to error and a dislike of it. As an Aristotelian mean the sense of accuracy should be free from both slovenliness and pedantry. But somehow it seems to have a tendency to develop a vice of its own that corresponds neither to pedantry nor to slovenliness. This is a sort of self-satisfied appreciation of what we know. The same feeling can extend into the moral side and produce smugness. But on the cognitive side it has a convenient if colloquial name: Priggishness. This state of mind may be said to be the later stages of the argumentativeness of the earlier stages. The boy who will truculently thrust down his comrades' throats his own views of the nature of things as they are, will at a later stage adopt a coldly superior air, and merely smile contemptuously when his fellows enunciate what he regards as silly arguments. This is the bad side of the sense of accuracy, but its good side remains in spite of the passing superciliousness. The person who has this sense well developed is keenly alive to all symptoms of error, and is never happy when there is any prospect of going wrong. This wholesome state of mind will naturally be accompanied by a readiness to test any doubtful point, without being greatly disturbed by the fear

of error, or thrown out of gear by the discovery of an error that already holds him. He will not be afraid to think, nor will he be unduly diffident about his conclusions when reached. But he will be always alert and on the look-out for possible slips in his reasoning, or inaccuracy in his data. He will have the habit of continually projecting new facts against a background of knowledge acquired by reading and experience. He will pay the psycho-analyst the compliment of taking note of the possibilities of the unconscious. He will respect the inarticulate growlings that come up from below the threshold, and will give to concepts that are struggling towards consciousness time to fight their way over the threshold. For he will realise that the mind is one and indivisible, and that concepts in the unconscious are obeying the same laws as those in consciousness, and are entitled to consideration in relation to those at the moment above the threshold.

His whole attitude towards error will be broadened. While a keen hunter after truth, he will not attach too much importance to certain forms of error. His standard will be positive, not negative; he will regard errors as stepping-stones to truth, and will do his best to reduce the number of such steps. Naturally he will still retain his bias in certain directions, but he will be aware of this bias, and will take all possible precautions against it. With all this, he will adopt a reasonable attitude towards the errors of others. While severe with himself, he will be lenient towards others. But he will have above all a balanced way of dealing with errors as a whole.

His final asset will be his power of treating his own errors. He will have acquired the power of not only detecting but also of correcting them. Skill in self-correction is one of the most precious fruits of a good education. As the result of careful training by a skilful teacher, the pupil should acquire this double power of detecting and correcting errors that he makes as he goes along. At the early stages of education it is the teacher's business to point out errors and to correct them. But as the process advances, the pupil ought to be encouraged to take a hand in the game, and become more and more his own detector and corrector of errors. This, in fact, is one of the most conspicuous ways in which the pupil shows that he is responding to the teacher's efforts.

It is generally recognised that education is a bipolar process: the two poles being the teacher-pole and the pupil-pole. At the beginning of the process the teacher-pole is much the more active; indeed, from the purely educational standpoint, it is the only active pole. But by and by, as education proceeds, the pupil begins to take a small hand in the game. The time at which he begins to take an interest in the process as such varies with the individual. There are cases in which it may almost be said that education remains unipolar throughout. The pupil is a mere passive partner. He responds to stimulus in a more or less mechanical way, but he takes no part in directing the process, shows no initiative, is a mere piece of material on which the teacher works. Others begin to take an interest in the process at a comparatively early stage; while

still others remain sleeping partners till well on in their teens. But in every case of successful education, at some stage or other the pupil begins to take himself in hand, to wonder what it is all about, and to join in a process that he recognises to be bipolar, though he may never think of applying this term to it.

In a well-ordered school the teachers fit in to this gradual development of the pupil's interest in his own education. For every step the pupil takes into the active work of educating himself, the teacher takes a step backwards. The more the pupil advances into the limelight, the more the teacher steps back into the surrounding gloom, till by and by, in a successful course, the individual pupil is fully in the limelight, while the teacher is standing in the background, a sympathetic and interested onlooker. In a sense, the teacher never becomes entirely useless, even at the highest stages in the school. It is not a matter of the teacher becoming quite dispensable. His work becomes less and less active, less and less obvious. But he remains as useful as ever, though in a different way. Teacher and pupil are still working as partners, but the teacher-function is now different. He is no longer the source of power; the active influence now comes from the pupil. But the teacher is as essential as ever to success in the educational process. The pupil may be said to educate himself by reacting upon the teacher. At first the teacher communicated certain pieces of knowledge, saw that they were assimilated, and then waited for the educational effects to follow in their proper course. At

the later stages the pupil wants to acquire certain knowledges and skills in order that he may become a certain kind of man that he has set up more or less deliberately as his ideal. To this end he finds the teacher of the greatest possible use; so, in the final years of the course, teacher and pupil work along as partners who understand one another and fit into each other.

In preparing for this passage from the period at which the pupil is mainly educand to that period in which the pupil is mainly educator, nothing helps more than co-operation in the matter of errors. Once the proper relation is established between the teacher and the pupil in connection with the detection and correction of errors, the partnership is set up on a wholesome basis, and it is only a matter of time till the pupil emerges from the stage of pupilage and comes into the light of equal partnership. In fact, perhaps the finest result of the skilful manipulation of school errors is the hastening of the time of the complete understanding between pupil and teacher.

When the pupil leaves school, naturally the partnership between him and his teacher is dissolved, and it is to this point that the whole school course should lead. The end of a successful education should be just this easy and natural disruption of a relation that no longer has any justification. Thackeray says somewhere that the wooer's best plan of campaign is to make himself indispensable to his lady. With the educator the advice should be just the opposite. The teacher's end in the double sense of aim and terminus is to make himself unnecessary. When he

has put the pupil in the position of being able to do without him, he has fulfilled his function so far as that pupil is concerned. In no part of the educative process is this gradual shuffling off better illustrated than in the treatment of errors. The moment of a pupil's emancipation may indeed be held to have come when he has acquired the art of behaving intelligently in relation to errors, his own and those of others. As a result of a long training, during which the pupil has been taught to reduce the number of errors in his mental-content, he has not only diminished the total number of individual errors that make up the residual store in his mental-content, but has acquired the power of detecting errors for himself, and correcting them in the most effective way. The ideal result of the teacher's treatment of errors during the school course should be the feeling of the finished pupil that he is at home, efficiently and comfortably at home, in his surroundings—always on the look-out for possible error, and confident that he can deal effectively with it when it appears.

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